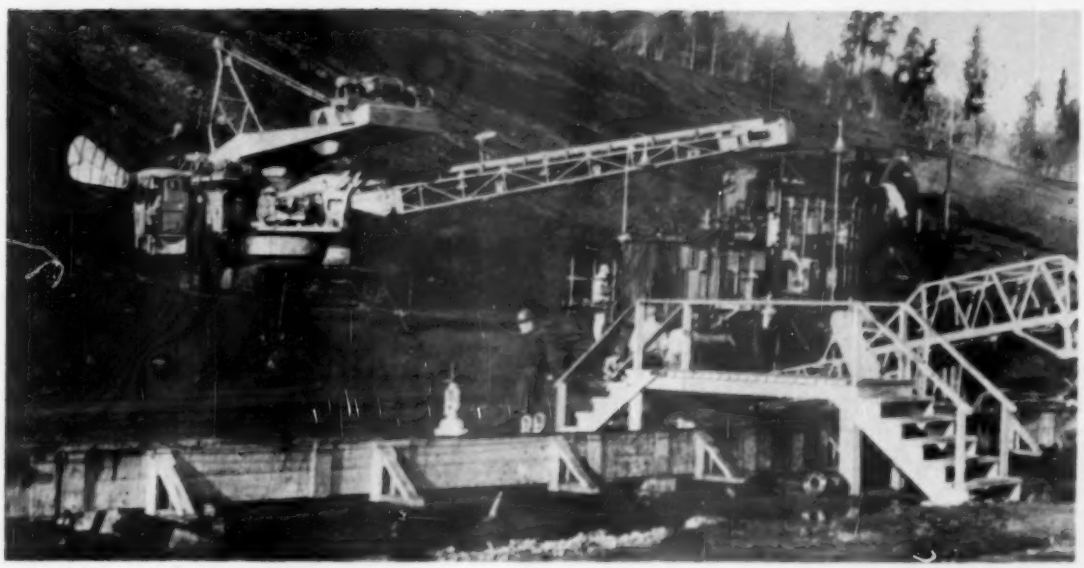
JAN. 15 1960

PETROLEUM WEEK

A McGRAW-HILL PUBLICATION



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Price 50 Cents

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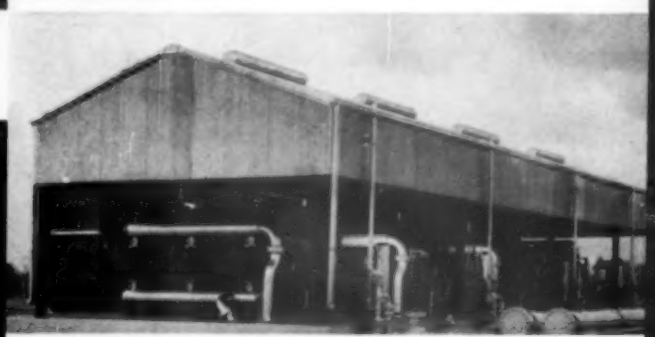

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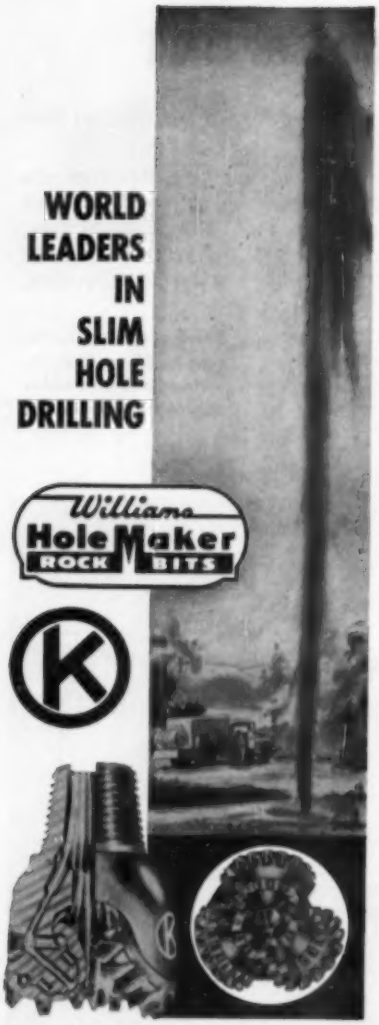

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DEPT/Opinions

Views That Make News . . .

"When referring to 'one successs in nine wildcats drilled' as the average ratio of success in the U.S. we mean that this is the indicated or suggested ratio at the close of the year in which the reported wells were drilled. Some of those supposed successes turn out to be failures in a few months. Those which are better producers lead to the drilling of offset wells, so that in a few years several or many additional wells may have been drilled in the normal expansion of the producing area as a field.

"After not less than four years, enough is generally learned of the size and nature of the field to permit a fairly accurate estimate of the quantity of recoverable reserves of oil and/or gas.

"Taking this estimate into consideration, together with the costs of drilling and operating the wells which have been, or must be, drilled to extract the oil and/or gas, and crediting the whole field to the wildcat well that first discovered it, careful study of the statistics for the entire industry for the entire U.S., for the decade 1943-1952, demonstrates that on the average only one wildcat out of every 27 drilled discovered a field large enough in its reserves to be commercially successful."

—FREDERIC H. LAHEE
Consulting geologist

"It is possible that the present condition of domestic oversupply in petroleum may be ended in three to five years; it is almost certain that it will be substantially reduced within ten. Similar trends exist in the world supply picture. In due time the volumes of low-cost oil from abroad will no longer be pressing so hard at our ports of entry."

—ROBERT C. GUNNESS
Executive vice-president
Standard Oil Co. (Ind.)

"Large nuclear power plants of a proven type can now be built which will produce electricity in some areas of high fossil-fuel cost at a cost competitive with conventional plants. It is now possible to guarantee the cost of these plants, their capacity, and the amount of fuel they will consume."

—GWILYM A. PRICE
Chairman
Westinghouse Electric Corp.

"The competitive position of our company was improved last spring when we were relieved of most of the disadvantage of not having an historical position as regards the importation of low-cost foreign crude . . .

"Last spring, by presidential proclamation, this advantage was divided among all refiners, thereby closing, for practical purposes, the gap between foreign and domestic crude prices. The refiners of domestic crude now apply their share of the advantage to reduce the cost of their purchases of domestic oil, thus, in effect, subsidizing the producers of domestic crude at the expense of importers of low-cost foreign oil."

—REXFORD S. BLAZER
Chairman
Ashland Oil & Refining Co.

. . . and Letters

Dear Sir:

In your article on marketing and production of several of the major oil companies [PW—Dec.4'59,p18], you show Shell Oil Co. as a producer in 15 states, not counting Nevada and Montana. Actually Shell is the largest producer in Montana and the only producer in Nevada. This makes a total of 17 states. Since your article was published, Shell has established production in North Dakota in the Shell-NP 32-15, in the Medora area.

R. G. WARING
Geologist
Shell Oil Co.

Dear Sir:

In your special report "In Drilling: Time for a Change" [PW—Oct.9'59, p65], you show my position with the Hughes Tool Co. as assistant chief engineer. I will appreciate a correction in your records that will reflect my position as assistant vice-president, engineering.

LYLE L. PAYNE
Assistant vice-president, engineering
Hughes Tool Co.

PETROLEUM WEEK will publish each week comments from readers on timely, pertinent subjects. Such expressions are welcome.

Address all such correspondence to LeRoy Menzing, Editor, PETROLEUM WEEK, 330 W. 42nd St., New York 36, N.Y.

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INSIDE *Slant*

DEMAND SHOULD GOVERN

There is one very pertinent point in the year-end statement of L. F. McCollum, president of Continental Oil Co.

It is: Demand should determine the volume of production.

Unfortunately, the industry seems reluctant to recognize this fundamental principle of economics.

This also is true of some regulatory officials, who continually ignore nominations and set allowables in excess of actual needs.

Fortunately for the industry, this practice has not been followed by the Texas Railroad Commission and some other regulatory bodies.

Those ignoring nominations as an indication of demand apparently look only at the tax revenue.

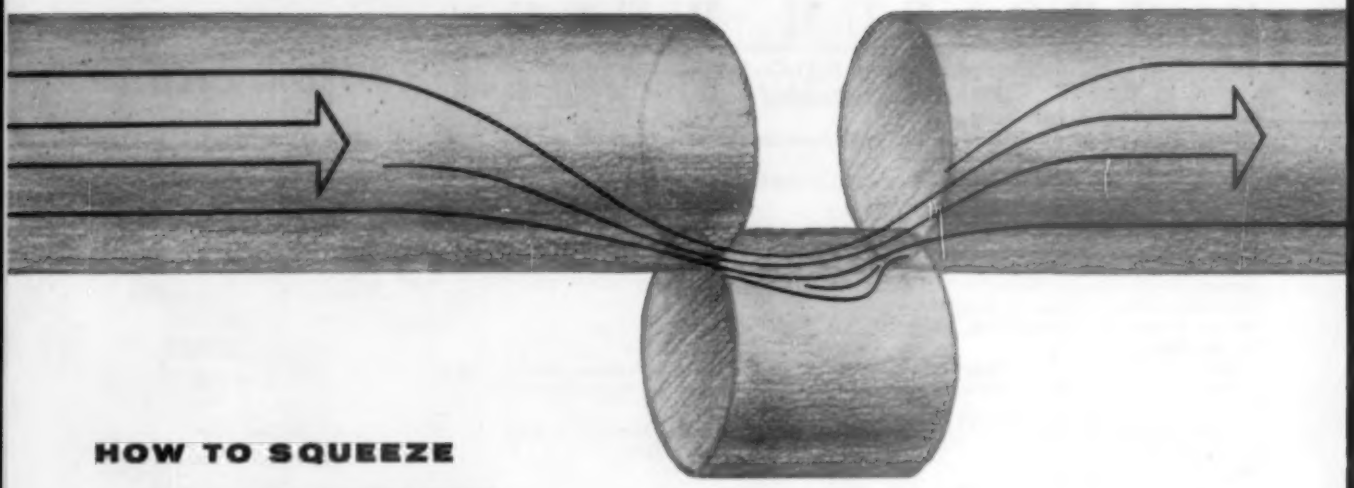
And their attitude seems to be: If you don't want the crude, then do your own prorating.

This, in effect, is saying: You do the job for us.

But, in the majority of cases the companies are reluctant to invoke purchaser-proration in the states that ignore the law of supply and demand.

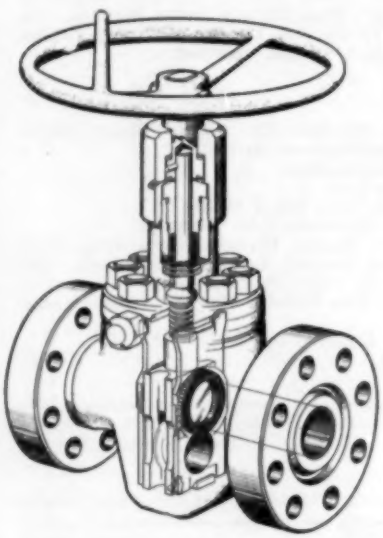
And when the companies fail to prorate, aren't they being just as negligent in their duties?

LeRoy Menzing
Editor

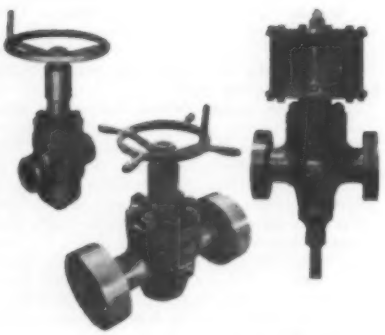


HOW TO SQUEEZE PRESSURE WITHOUT SQUEEZING PROFITS

Our illustration shows flow material in a valve as it would appear *without* the valve. This is the critical moment when the valve closes or opens. Notice how pressure and erosion are concentrated on one small part of the downstream sealing surface. In every valve except the Cameron Gate Valve this same small area is attacked each time the valve is opened or closed. Plug Valves, Ball Valves and other Gate Valves begin to lose pressure when this small portion of the sealing surface is worn away. In today's tough oil field services only thousandths of erosive wear can break the seal and squeeze profits instead of pressures.



Phantom view of Cameron Gate Valve showing double rotating seal rings.



Cameron Gate Valves are available in sizes from 2 to 6 inches, and pressures to 15,000 psi, including hydraulically and air-operated valves for remote controls and automated circuits.

Downstream sealing surface on ordinary valves, notice small area which receives most erosion.

Downstream sealing surface on Cameron Gate Valve, the wear pattern changes with each operation.

But, in the Cameron Gate Valve (and only the Cameron Gate Valve) a new sealing surface is presented to the erosive blast each time the valve is operated. Valve life is increased tremendously — costs after purchase are greatly reduced. All of this makes the Cameron Gate Valve the least expensive valve in its class to operate — helps you put the squeeze where it belongs on pressure instead of profits.

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60-Second Summary / WHAT'S HAPPENING IN OIL

AT-A-GLANCE PETROLEUM WEEK

January 15, 1960

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Intensified efforts are being made by four U.S. and Canadian oil companies to tap Alberta's Athabasca tar sands. Extensive pilot plant operations are under way. The lure: 300-billion bbl. of oil—more than the world's present known supplies. . . . p. 9

•

The world oversupply is causing many companies to tie exploration for oil to areas with market outlets. It means that, for the moment, traditional export areas, such as Venezuela and the Middle East, will be of little interest. . . . p. 12

•

A big year seems to be in prospect for Canada's petroleum business, with natural gas leading the way. But much of the optimism hinges heavily on pending applications to export more gas. . . . p. 19

•

Oklahoma's first commercial attempt to recover hydrocarbons by in-situ combustion is in the final preparatory stages. A fifth hole is being completed now, amid expectations that the formation will be fired by early spring. . . . p. 22

•

Quick approval is anticipated for Michigan Wisconsin Pipe Line Co.'s proposed natural gas expansion in the Midwest. The company plans to build 529 mi. of loops to boost gas deliveries by 175-million cf/d. . . . p. 30

•

Annual savings of millions of dollars may be a result of a breakthrough in refinery maintenance operations. The program is being formalized and finalized by Standard-Vacuum Oil Co. . . . p. 37

•

U.S. tanker owners want a presidential edict to guarantee themselves 50% of oil import cargoes. They charge their share has dropped from 76% to 5% in a decade. . . . p. 30

•

There's reason to believe that Libya's new-found oil may move into world market places sooner than had been anticipated. Esso is pushing pipe deliveries, even though the route of its line has not been determined yet. . . . p. 32

•

Greaseless bearings are winning increasing acceptance in the automotive industry. Refiners can take some consolation, however, in the fact that they're made from petrochemicals. . . . p. 38

•

Pleasure boating is still on the upswing, and higher-octane fuels are needed for the lighter, more powerful engines. Horsepower is being stepped up, and there's even a diesel outboard available. . . . p. 42

Up to the Minute / SIGNIFICANT LATE NEWS

AT-A-GLANCE PETROLEUM WEEK Copyright

January 15, 1960

Evidence of gas production costs will be submitted at the rehearing of the CATC gas sales case in March. Attorneys for the four companies—Continental, Atlantic, Tidewater, and Cities Service—agreed to present cost evidence at the next Federal Power Commission hearing, but reserved the right to deny the necessity of such testimony. Examiner Ewing Simpson will preside at the hearing now scheduled for Mar. 15.

Other subjects to be broached in the hearing will be the history of negotiations, gas supply contracts, natural gas reserves data, and field price testimony. Participants in this week's prehearing conference also agreed to a number of simplified procedures, including fewer witnesses. The Supreme Court ordered the rehearing last June, implying that FPC should give more consideration to preventing excessive prices.

•

Pure Oil Co. joined the parade of companies streamlining their organizations this week. Pure Oil will reorganize field operations in its exploration and production divisions this summer, closing the Tulsa and Ft. Worth offices, and expanding its Denver and Houston staffs. The company said the actions are being taken to "increase efficiency and effectiveness."

•

Downward adjustments in crude prices have spread to the Upper Gulf Coast of Texas, a continuation of a trend that started nearly a year ago. Sinclair Crude Oil Co., effective Jan. 5, trimmed its postings by 15¢ a bbl. to a top of $3.20 for 40-gravity oil. The move affects 18 fields in the Silsbee area. It involves about 14,000 b/d.

Crude buyers describe the adjustment as a "serious" one, making the new posting "the lowest for any Gulf Coast crude." The present pattern of adjustments dates back to early 1959, when cuts of from 7¢ to 15¢ were initiated for Louisiana coastal crudes.

•

A proposed multimillion-dollar advertising campaign to stimulate gasoline demand drew mixed reaction, then support this week from key marketers. The General Committee of API's Division of Marketing sat in special session to hear the proposition set forth by H. L. Moir, of Pure Oil, chairman of its subcommittee on stimulating demand.

Most marketers were impressed with the basic campaign, but were concerned about financing it. Moir suggested that participating companies allot 2% of their national advertising budgets, estimating the total involved at $3-million to $3.5-million.

The General Committee subsequently approved a motion to expand the Moir subcommittee, and charged it with presenting to oil companies an advertising and publicity campaign to stimulate gasoline demand. Costs would be assessed on a pro-rata gallonage basis, and a director would be hired to spearhead the program. Four companies—Pure, Atlantic, Esso, and Mobil—said they would support the proposed director on a month-to-month basis.

gum formation can destroy a gasoline's good name... protect yours with Tenamene

Eastman gasoline additives

When buying gasoline additives, keep these three points in mind:

One, Eastman offers you every principal type of gum inhibitor in commercial use today.

Two, Eastman, as a basic manufacturer of the additives it supplies, maintains complete control every step of the way, assuring you of a uniform product and consistent additive performance.

Three, Eastman petroleum specialists provide on-the-spot service to make sure you obtain the most efficient use of the additives you buy. Ask them about cutting costs through bulk delivery.

You'll find Eastman petroleum specialists can give you unequalled technical service because inhibition of gum formation is their only interest. EASTMAN CHEMICAL PRODUCTS, INC., subsidiary of Eastman Kodak Company, KINGSPORT, TENNESSEE.

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tenn.; Atlanta; Chicago; Cincinnati; Cleveland; Detroit; Framingham, Massachusetts; Greensboro, N. C.; Houston; New York City; St. Louis. **West Coast: Wilson Meyer Co.,** San Francisco; Denver; Los Angeles; Phoenix; Salt Lake City; Seattle.

Standard Oil Company of California, Rig LAI #173, Inglewood.

Servco Pilot Mill mills up 170′ of 5½″, 15.5#, J55 casing in 16 hours, 50 minutes!

In this Standard string, two separate sections of 7″, J55 casing, totalling 170′, were swaged to 5½″, 15.5# and run opposite independent producing zones. After cementing and testing, the swaged areas were milled out with one 6½″ Servco Pilot Mill in 16 hours, 50 minutes!

Prior to development of Servcoloy*, costly, slow-milling aluminum alloy casing would have been used in the reduced sections. Substituting steel casing resulted in important savings both in casing costs and rig time.

Use Servcoloy on your next milling job. Cutting rates possible with this unique milling material can't be matched. Your nearest Servco office will give you the full story.

*U.S. PAT. NO. 2,833,630

Steel shavings taken from the shaker prove Servcoloy efficiency.

SERVCO

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Drive Begun to Produce Tar Sands

- **A four-company group is seeking commercial methods to mine, process, and transport tar-sands oil to markets.**
- **Success would open a 300-billion-bbl. reserve, bringing far-reaching effects on world-wide petroleum sources.**

A program to tap the world's largest known oil reserve, which has defied commercial production since its discovery 172 years ago, is being intensified by a four-company team of U.S. and Canadian oil companies.

The four-company partnership includes Imperial Oil Ltd., Richfield Oil Corp. (L.A.), Cities Service Athabasca, Inc. (a subsidiary of Cities Service Co.), and Royalite Oil Co., Ltd.

The four have joined in an experimental project to determine the feasibility of commercially extracting liquid hydrocarbons from the Athabasca oil sands in Western Canada.

Imperial, Cities Service, which instituted its own tar sands research two years ago, and Richfield each hold a 30% interest in the partnership. The remaining 10% is held by Royalite.

Cities Service Athabasca will be the operator of the project, and has established headquarters in Edmonton.

President of the operating firm is A. P. Frame, senior vice-president of Cities Service Co. Lee N. Haugen, recently vice-president of Cities Service in charge of research, will be vice-president and general manager, with headquarters at Mildred Lake and Edmonton.

Should this project be successful, oil from the 300-billion-bbl. Athabasca tar sand reserves will be available to compete in North American markets within the near future.

Should any emergency call for additional petroleum in the Western Hemisphere, these hydrocarbons could be made more quickly available.

The commercial development of the tar sands oil—mining, processing, and transporting to markets—may make it possible to compete with other petroleum fuels.

Pilot plant operations already are well under way at Mildred Lake, where the oil sands lie partially exposed on the banks of the Athabasca River.

Mildred Lake is approximately 300 mi. north and slightly east of Edmonton, in Alberta (map).

The pilot plant, in operation since August, 1959, was constructed at a cost of $3.5-million after almost two years of experimental work by Cities Service.

The plant includes specially constructed mining equipment and conventional refining equipment capable of processing 3,000 b/d of hydrocarbons.

The mining equipment removes oil sands from the escarpment and transports it to a mobile extraction unit. The extraction unit returns clean sand back to the escarpment and forwards the liquid hydrocarbons on to the refinery.

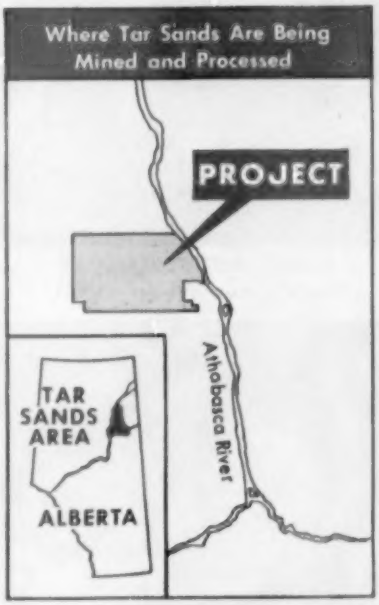
The development program is one of the most extensive now being carried on by any oil company or group of companies anywhere in the world.

The problem has been to devise a means of extracting the liquid hydrocarbons from the sands at a cost competitive with conventional methods of oil production.

The start of commercial production from the tar sands will eventually have far-reaching effects on world-wide oil sources.

The reasons are:

- The 300-billion-bbl. reserves in the over-all area already exceed known world reserves of crude.
- The reserves are closer to the largest petroleum-consuming countries than any other proven sources of supply. For example, U.S. proved crude reserves are only slightly in excess of 30-billion bbl.
- The accessibility by pipeline to such markets will affect the normal outside sources of major supply to North America, such as Venezuela and the Middle East.
- Modern technology should permit the economic recovery, purification and transportation of the hydrocarbons as a fuel oil for any fuel-short Canadian areas.



MILDRED LAKE is the scene of one of the world's most extensive oil developments.

No doubt, the multimillion-dollar development program will be expanded considerably with the construction of processing and transportation facilities, provided the pilot plant proves successful.

It is understood that present plans call for the construction of a pipeline from Mildred Lake to Edmonton, where the processing plant would be built.

The partnership's pilot plant operation at Mildred Lake is utilizing tar sands mined and processed from a portion of a 50,000-acre lease.

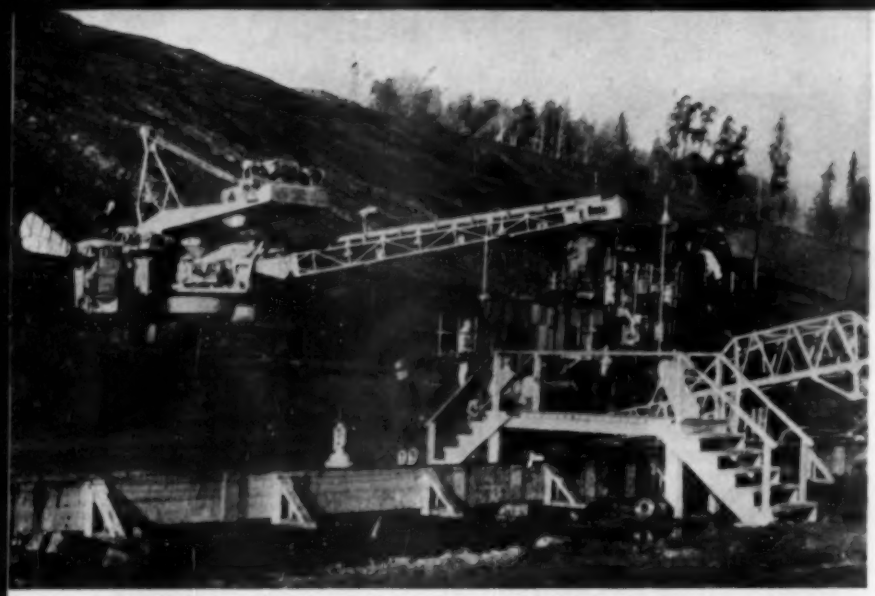
In addition to these 50,000 acres, Cities Service has acquired 186,000 acres, and Richfield has made available to the group three 50,000-acre permits.

The mineable portions of the tar sands vary in thickness from 150 to 200 ft. and are located on top of limestone.

The overburden on top of the sands along the Athabasca River ranges from 25 ft. to 100 ft. in thickness.

The deposit itself consists of rounded unconsolidated sand grains which are water-wet.

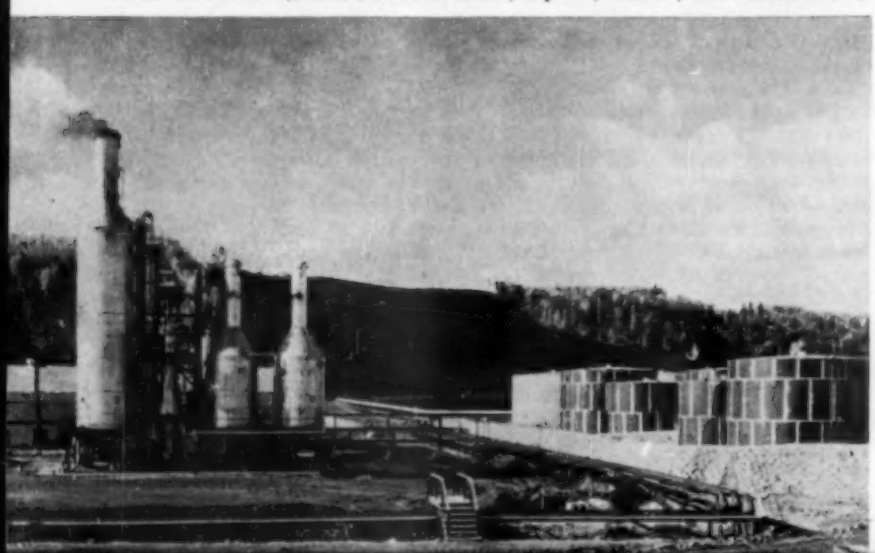
About 5% of this material is finer



A LARGE MINING MACHINE stripes the overburden and scoops the bituminous sands. The material is transported on a conveyor belt to the extraction unit (right).

THE MINING WHEEL being used is 9 ft. in diameter and is installed on a 20½-ft. boom. The six 1.8-cu. ft. buckets have hard, erosion-resistant cutting edges.

THE PILOT PROCESSING UNIT is a simplified thermal cracking unit, or visbreaker. Products from the 3,000 b/d unit are diluent, naphtha, bitumen, and visbreaker fluid.



than 200-mesh and consists of fine sand, clay, and silt.

The average hydrocarbon content of the deposit is about 10% by weight. The hydrocarbons themselves are approximately 7.5-gravity and are solid at atmospheric temperature.

About 50% of the hydrocarbons boil below 1,000F.

The sulfur content is roughly 5%, with vanadium running about 200 parts per million.

In the formation itself, there are relatively thin clay lenses practically barren of hydrocarbons. Other areas are pure bitumen.

Reserves on the 50,000-acre lease alone are estimated to be in excess of 10-billion bbl. It has been calculated that 100,000 b/d of oil could be taken from only 5,000 acres for 33 years.

Extensive core-drilling — exceeding 325 holes—on this and some of the other tracts held by the group has revealed mineable and recoverable reserves in excess of 40-billion bbl.—more than the present total U.S. reserves of crude.

Additionally, core-drilling has revealed considerable oil free from sand. The total of these reserves approximate those of a major discovery in the U.S., considered to be one of 100-million bbl. or more.

To the west of the Athabasca River, the oil-rich sands of the McMurray formation dip to depths of 1,000 ft. to 1,500 ft.

The Athabasca sands actually yield a bitumen, which through hydrogenating can be converted into crude of approximately 35-gravity.

This material must be mined, transported, processed, and disposed of in a very short time and over as little distance as possible. Otherwise, the installation and operating costs of the process would be prohibitive.

The present installation, therefore, is for the purpose of determining the capacity, recovery rate, and other operability data that will make the project commercially economical.

Because of the high sulfur content of the tar sands, it is probable that hydrogenation is the only possible way to convert the bitumen to a low-sulfur crude.

Mining of the bituminous sands is done by means of a Krupp wheel excavator.

The wheel was not selected until the Athabasca group's executive engineers scoured both the U.S. and Europe for suitable mining machinery.

It was in the Ruhr Valley in West Germany that the most promising device was found.

There, German fabricators had engineered and built gigantic mining

wheels for the commercial exploitation of brown coal.

One such typical wheel mines 143,000 cu. yd. of coal per day.

Buckets fastened to a huge wheel dig into the mining face, and drop their load on a conveyor belt, which transfers it, in the case of the tar sands, to an extraction unit.

The wheel itself rests on tractor treads. Each tread has its own drive. A control cabin moves up and down to permit the operator to be close to the cutting face.

The machine is ingeniously constructed in terms of counter-balancing, and the independent drives of all the operating equipment make it an exceedingly flexible device.

Convinced that the mining wheel offered the greatest potentiality, the Athabasca engineers ordered a smaller version that would be suitable for pilot plant research and operation.

German engineers visited the tar sands area, ran various tests, and designed a suitable machine, which now is in operation at Mildred Lake.

The diesel-electric experimental wheel now being used can handle 9,600 cu. yd. of material per day.

The 9-ft.-diameter digging wheel is installed on a 20.5-ft. boom capable of covering a wide area.

On this wheel are fastened six 1.8-cu. ft. buckets with hard-surfaced, erosion-resistant cutting edges.

The machine also has a tail boom, 38 ft. long, carrying the far end of the conveyor belt.

Current for this unit is produced by a Deutz diesel generator set, mounted on a trailer.

The present extraction equipment has been designed as a portable, self-propelled unit, which will operate in the field along with the mining equipment.

The sequence of operations calls for the bituminous sands to be delivered by the conveyor from the bucket wheel to the extraction unit.

The first step consists of separating rocks and foreign material.

The second and basic extraction process uses a diluent, produced from the bitumen itself, to reduce the viscosity and specific gravity of the bitumen.

Water is then used to establish a continuous phase in the water film surrounding the sand particles.

This causes the water-wet sand particles to precipitate, freeing the diluted bitumen for subsequent processing. The precipitated, oil-free sand is discharged to the escarpment area.

Leaving the extraction unit, the mixture of water, diluent, and bitumen passes through a settling basin.

Tar Sands Were An Oil Lake Covered By Sand

There is considerable speculation as to how the tar sands were laid down.

However, the most accepted theory is that millions of years ago they were a lake of oil.

Down through the years, sand was blown in and settled into the lake, entrapping the oil. The wind-blown sand theory is substantiated by the fact that the sand grains are rounded, and not sharp.

Once the oil was entrapped into the sand, winds and glaciers continued to build up the soil, which forms the overburden of the sands.

The sand, while not suitable for concrete-mixing purposes because of its rounded shape, is fine for the glass manufacturing industry.

But one day's output of sand under full-scale operation would supply the glass industry for one year.

The oily mixture is decanted from the water.

The water is recycled to the extraction unit, and a small quantity of make-up water is added.

Flow and temperature of the recycle water is controlled by the separation unit operator, while the temperature of the make-up water is regulated automatically by means of 100-psi. steam injection.

The diluent recovery unit, which separates the bitumen from the diluent, has been designed to process 3,000 b/d of a mixture containing 67% diluent and 33% bitumen by volume.

The diluent is returned to the extraction process, while the virgin bitumen is split into two streams. One goes to storage for subsequent use as fuel, while the other is charged into a visbreaking unit.

The recovery of the diluent is accomplished by heating the mixture in a furnace and flashing it at high temperature and atmospheric pressure.

The stripped bitumen is then fed to a visbreaker installation, which is actually a simplified thermal cracking unit.

The unit was prefabricated by M. W. Kellogg Co., and shipped to Mildred Lake.

The bitumen passes successively through two oil-fired furnaces.

The effluent is quenched in a soaking drum, then collected in a receiver, from which the tail gas is vented to a flare.

Some coke is unavoidably formed in the furnaces and the soaker drum. It must be spalled and burned, with the help of steam and air, as part of a regular schedule.

The net liquid is pumped from the receiver drum as the product.

Products emerging from the combination diluent-recovery and visbreaking units are, finally: diluent, overhead naphtha, bitumen, and visbreaker fluid.

The furnace of the diluent-recovery unit and the two visbreaker furnaces are of the single upfired helical-coil oil-burning type.

The diluent-recovery furnace is the largest: It has four burners each capable of delivering 5.7-million Btu. per hour

It also is equipped, near the bottom, with an extra steam coil for the production of superheated steam.

Each of the two visbreaker furnaces has two burners, each of which is capable of delivering 1.65-million Btu. per hour.

Diluent, or diesel fuel, is used for starting, and steam-atomized bitumen as regular fuel.

Electric power for the Mildred Lake project is supplied by two Caterpillar diesel generator sets.

Three-phase 60-cycle 440-volt power is supplied to the many pumps and compressors.

Single-phase 60 cycle 115-volt current is supplied for light and instrumentation.

Batteries are provided for emergency lighting, and an extra standby generator to feed the boiler, in case of emergency.

An elaborate fire protection system covers every portion of the Athabasca installation, from the mining area to the living quarters.

The system consists of high pressure water distribution, dry chemicals and portable extinguishers.

Water from the Athabasa River is carefully treated for human consumption as well as for steam production, and for process and cooling water.

The water, before being returned to the river, is treated to make it purer than when taken out. It contains no oil, chemicals, or solids of any kind, with nothing injurious to plant or marine life.

The temperature of the water being returned also is controlled.

Two Foster-Wheeler boilers, each producing 21,500 lb. per hour of saturated steam at 100 psi., are supplying the steam for the plant.

Markets: Key to World Exploration

The prospect of a continued period of world oil over-capacity is forcing oil companies to switch exploration emphasis away from oil export areas to areas with a built-in market.

"There's no rush to find oil just for the sake of having oil," one company official told PETROLEUM WEEK. "In today's oil picture, it's the ability to sell the oil that counts."

Argentina is a good example of how companies are flocking to a "marketing" area.

In late 1958, several companies—including Indiana Standard, Esso, Shell, Union Oil of California, Tennessee Gas Transmission, and the Carl M. Loeb-Rhoades group—started signing special contracts with the government oil agency, Yacimientos Petroliferos Fiscales. Some of the pacts included exploration and wildcatting; others were drilling and producing agreements.

All oil produced under these contracts is to be sold to YPF for the growing Argentine market.

Several contracts also grant the companies preference in supplying Argentina with imported oil. Indiana Standard, for example, will get preference—after the third year—in all crude imports.

In addition, Esso and Shell, both long-established producers in Argentina, were assured of retaining specified minimum percentages of the Argentine market when they signed new agreements.

Similarly, the French government's policy of giving French Community oil top priority in its large domestic market is prompting increased exploration in French areas.

This trend is getting further impetus from the French effort to negotiate priorities for Sahara oil in the entire six-nation European Common Market (PW—Dec.18'59,p20).

U.S. companies—such as Indiana Standard, Cities Service, Sinclair, Phillips Petroleum, and Newmont Mining—have acquired interests in French Sahara exploration. So have Ausonia Mineraria, an Italian independent, and Wintershall AG, a German independent. In addition, Cities Service and Continental Oil have teamed up with French companies to explore for oil in Senegal and Mauritania—two other members of the French Community.

Even the international majors, with surplus oil of their own begging for markets, have had to team up with French companies to assure getting in on some "French" oil.

In France, itself, the international companies, which own most of the refineries, have already been forced to agree to handle 80% of new Sahara oil for the next few years. This doesn't mean it must be processed in France.

Hence companies like Jersey Standard, Shell, and British Petroleum have gone into the French Sahara. In late December, they were joined by Socony. And the Caltex group has also applied for acreage in the Sahara.

In addition, Socony is teamed up with a French company for exploration in Gabon and the Middle Congo, both now republics within the French Community. Shell has joined the same French company for exploration in other areas of Gabon.

Another example of the current interest in the assured market tie-in is the desire for rights in Spanish territories.

The government has made it clear that it will buy any oil found in the Spanish overseas territories to meet its growing domestic demand.

More than 20 companies, ranging from independents to the large international majors, offered a wide variety of "extras" as incentives for the heavily overlapped Spanish Sahara rights.

This week ten groups, including 14 U.S. firms, reportedly had received rights in the Spanish Sahara.

Unofficial sources in Madrid reported that the U.S. winners (some of whom have Spanish partners) are: Caltex, six blocks; Sohio with Tidewater, eight; Gulf Oil, five; Union Oil, three; Sun with Pure and Champlin, two; Richfield (L.A.) with Cities Service, four; Phillips, two; Atlantic, one; Pan American, two; and General American, two or three.

On the other hand, exploration emphasis is declining in areas where no ready market is available. Witness the lack of interest in new concessions in the Middle East.

Iran, for example, has had no offers for several new inland districts it opened for bids in 1959, whereas two years ago interest even in inland areas of Iran was substantial.

Similarly, there were active negotiations for the inland preferential area of Saudi Arabia two years ago; there has not been any recent interest in bidding there.

The decline in exploration interest in export areas is also evident in Venezuela.

In 1956 and 1957, companies paid bonuses of over $600-million for new concessions.

Now, interest in these concessions has declined markedly.

Newcomers, such as Superior and Signal, "found the door shut" on many hoped-for outlets for Venezuelan oil when the U.S. government clamped down with mandatory import controls. These firms have found oil; their problem is where to sell it.

At the same time, the enthusiasm for Venezuela of the established international companies, which have alternate sources of lower-cost oil, has been dampened by a stiff, new tax decree, which made Venezuelan oil more costly and less competitive in international markets.

As a result, exploratory drilling has tapered off even more drastically than in most other export areas. In one week last December, a total of 64 tests (including 19 development wells) were being drilled. That compared with a weekly average of 127 in 1958.

The one big exception in the trend is Libya, where interest is hot despite the lack of an "assured" market.

Libyan oil is export oil with a special competitive edge, however.

It has a decided transportation advantage over Middle East oil: It's west of the Suez Canal, and just a hop, skip, and jump from the big European market. And what's more, it has a cost advantage over French Sahara oil.

Libyan oil is found at a shallow depth—shallower than in the French Sahara. And it's only 100 mi. from the Mediterranean coast, compared to some 400 mi. for oil in the Sahara. The size of the Libyan discoveries indicates substantial production per well.

Hence, some 15 oil companies are now exploring in Libya. At the end of 1959, there were 25 geological and 35 seismic parties in the field. About 25 exploratory tests were drilled during 1959, with over a dozen discoveries. And the pace for 1960 will be even faster.

Wage Talks Next At Texas City?

Wage negotiations in the spring could be the next hurdle facing American Oil Co.'s Texas City (Tex.) refinery, where a record-breaking 191-day strike ended last week.

Management and Oil, Chemical & Atomic Workers officials, were optimistic, in a joint statement, about an era of "peace and cooperation."

But some sources feel that the wage

reopener clause may be invoked by the union in the not-too-distant future. All that's necessary is a 60-day notice.

Wages were not an issue in the Texas City strike. It was called, according to management, to support union demands for a voice in writing job descriptions and making job assignments.

The joint statement said, "The management-rights clause remains the same as in the previous contract. The language of the job-assignment clause was changed to the satisfaction of both parties."

The settlement was a management victory.

With minor exceptions, the terms were the same as those offered to the union on Dec. 8.

But, more significant, the modifications in the work-classification clause strengthened management's authority to reclassify employees.

This clause now reads:

"Work peculiar to a classification shall be performed by employees regularly assigned to that classification, provided that when there is no work required of an employee in his regular classification, he may be assigned to and perform work of an equal or lower classification . . .

"It is understood, however, that to expedite the job at hand in a reasonable and efficient manner, any employee may be required to perform temporarily jobs of another classification."

Many Oil Men Don't Know the Answers

A "quickie questionnaire" tossed at some 200 oil men attending a public affairs conference last month indicates that the petroleum industry still has a big job to do to "educate" its own people first.

The idea behind the questionnaire (right) was to gauge, in a general way, the information and interest levels of oil people in public affairs activities.

All of the participants came from middle and upper management levels of oil companies in the Midland (Tex.) area, where the conference was held.

Theoretically, their answers should have been better-than-average—but the tabulations disclosed some gaping holes in their knowledge of, and participation in, public affairs.

They were given a fast five minutes to answer 17 questions. Here are some of the highlights of their aggregate replies:

- 60% did not know the total of federal and state taxes on gasoline in the state.
- More than two-thirds were unable to name their state senator, although a large part of the registration came from a big district that runs from Midland to El Paso, where the current senator resides.
- The majority knew the names of their congressmen and state representatives. But fewer than one-third said they had contacted them about oil issues in the past year.
- Only one out of every four said he had made any kind of an industry speech in the past year, despite the proddings of oil's leadership to get all to become ambassadors of good will and understanding.

Public figures confused many of them, too.

- 63% correctly tabbed Sen. William Proxmire (D., Wis.) as unfriendly, and 58% similarly nailed Sen. Paul Douglas (D., Ill.). But more than one-third admitted they didn't know this pair of legislators who long have championed the "anti" sides of many industry proposals, including percentage depletion and natural gas.
- 45% conceded they didn't know the attitude of Sen. Oren Harris (D., Ark.), who has sponsored and fought for legislation desired by the petroleum industry—particularly measures to free gas producers from federal regulation. In fact, only 40% thought he was friendly toward the industry.
- Even more surprising, however, better than half didn't know whether Monroe J. Rathbone was friendly or unfriendly, though the poll itself was made only a few weeks after the Jersey Standard president had been elected board chairman of the American Petroleum Institute, amid a fanfare of national publicity.
- 60% thought Frank M. Porter was friendly, but 35% confessed they didn't know the attitude of this veteran Oklahoma independent driller who has been president of API since 1950, and is generally regarded as oil's unofficial spokesman.
- Eight out of ten felt President Eisenhower was friendly. But 35% said they were unable to call the turn in regard to Vice-President Nixon, while 58% considered him friendly.
- A majority, 71%, tagged Columnist Drew Pearson as unfriendly, but three-fourths couldn't decide on TV news commentators Howard K. Smith and Douglas Edwards.

"QUICKIE QUESTIONNAIRE"

INSTRUCTIONS: Do not sign. Give your own answers. Do not ask for help. Answer frankly, quickly. Time: 5 minutes.

1. What county do you live in? _____ County
2. Do you have a 1959 Poll Tax? (Check one) ____ Yes ____ No
3. Write last name of U.S. Congressman from your home district: _____
4. Name a member of the House of Representatives in the Texas Legislature from your district: _____
5. Name the member of the Senate in the Texas Legislature from your district: _____
6. What is the total state and federal tax per gallon on gasoline you buy? _____
7. Do you read a daily newspaper regularly? ____ Yes ____ No. If "Yes," give the name of the paper: _____
8. Have you written a personal letter to a member of Congress about an oil or gas industry issue in the last year? ____ Yes ____ No. About any other issue? ____ Yes ____ No
9. Have you written a personal letter to a member of the Texas Legislature about an oil or gas industry issue in the last year? ____ Yes ____ No. About any other issue? ____ Yes ____ No
10. Do you work for a company or firm ____, or are you self-employed? ____ (Check one)
11. Do you belong to a civic or service club (such as Lions, Kiwanis, Rotary, etc.)? ____ Yes ____ No. Have you ever arranged a civic or service club program about the Oil Industry? ____ Yes ____ No
12. In Presidential elections, do you generally regard yourself as ____ Democrat, ____ Republican, or ____ Independent? (Check one)
13. What kind of job do you feel your employer does in keeping you informed on oil and gas industry issues? ____ Good ____ Poor ____ Fair (Check one)
14. Generally, what attitude do you think the following persons have toward the oil and gas industry? (Check one)

	Friendly	Unfriendly	Don't Know
Howard K. Smith			
William Proxmire			
Lyndon Johnson			
Dwight Eisenhower			
Frank M. Porter			
Paul Douglas			
Price Daniel			
Drew Pearson			
Richard Nixon			
Douglas Edwards			
Monroe J. Rathbone			
Oren Harris			
Ralph Yarborough			

15. Under current tax system in Texas, do you feel the oil and gas industry is taxed ____ too much, ____ too little, ____ about right? (Check one)
16. Who would you say is one of the best-known "oil men" in West Texas? _____
17. Have you made a speech before any sort of public gathering concerning the oil and gas industry in the last ten years? ____ Yes ____ No. Do you recall reading or hearing about anyone in your company making a speech on an oil and gas industry subject during the past year? ____ Yes ____ No. If "Yes," who was the speaker? _____

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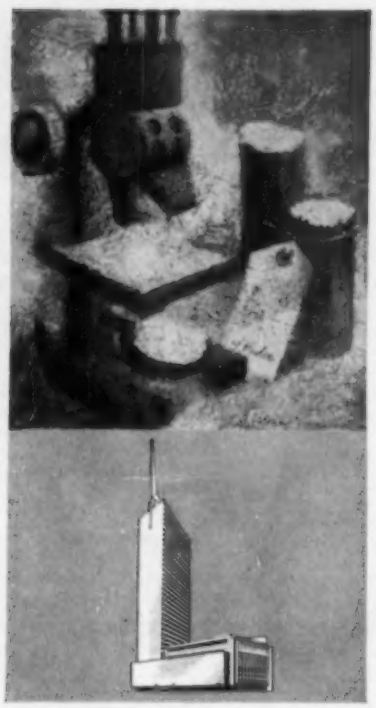

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What's New / IN THE INDUSTRY

A Treasury Dept. proposal to set a "cut off" point for percentage depletion apparently has been voided by a Supreme Court ruling. The high court this week in effect upheld a decision of last July by the Fifth Circuit Court of Appeals that a processor of wet natural gas is not entitled to percentage depletion since the processor hasn't acquired any "economic interest" in the gas in place held by producers.

The case involved La Gloria Oil & Gas Co., which earlier had been granted depletion as a processor by a federal district court. The case was appealed by the government, since the district court's ruling was contrary to the position of the Treasury Dept. The district court's ruling was that depletion on natural gas was based upon the amount received for products extracted, rather than on the basis of the wet gas at the well.

•

Another attempt to buy up control of Cosden Petroleum Corp., is being made by W. R. Grace & Co., New York. It has requested tenders of 1,580,000 shares, which is more than half of the 2,748,000 shares outstanding. Grace set a Feb. 11 deadline and offered $25 a share. The company said that if it obtains more than 50% of the stock, it may eventually acquire the business by purchase or merger.

•

Continued strong demand brought a 15¢-a-bbl. price advance for Pennsylvania Grade crudes this week. Joseph Seep Purchasing Agency of South Penn Oil Co. initiated the action because of the "continued draft upon stocks reflecting strong demand, as well as the necessary incentive to producers faced with increased costs." New postings are: Bradford, $4.55 a bbl.; Middle District, $4.37; Southwest Pennsylvania, $4.10, and Eureka $3.92.

But in Southwest Texas a second purchaser trimmed postings by 10¢ a bbl. Suntide Refining Co. made the cut in 19 fields in Victoria County, lowering its top posting for 40-gravity to $3.25, effective Jan. 11. The cut affected about 4,000 b/d. Last week, Republic Oil Refining Co. cut its postings by 10¢ a bbl. on 3,500 b/d in seven fields in Victoria, Refugio, and Calhoun Counties.

•

It'll take ten years for Gulf Oil to comply fully with last week's antitrust consent agreement on its acquisition of Warren Petroleum. One Federal Trade Commission stipulation specifies that the merged companies must file annual reports for the next decade on sales and supplies of LPG and natural gasoline. Another requires Gulf to file semiannual reports on sales and buyers for three years, or until Warren divests itself of certain properties.

Divestitures, under the consent agreement which ended FTC's three-year-old antitrust suit, will put Gulf out of the retail LPG business, but will enable Gulf to continue as a wholesaler and jobber of LPG. In addition, the order requires Gulf to offer nearly half of its LPG and natural gasoline supplies to independent purchasers.

•

The Senate's Constitutional Rights subcommittee is looking into the jailing of 13 union members in Kansas City. The Oil, Chemical & Atomic Workers Union said the subcommittee had taken up the matter at the request of Sen. John F. Kennedy (D., Mass.). The union contended that the Sugar Creek (Mo.) men, under Missouri law, were not allowed a jury trial or an effective appeal from the one-judge decision.

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Looking Ahead in Washington

McGraw-Hill
Washington
Bureau
January 15, 1960

Natural gas transmission companies are watching the Federal Power Commission for a possible increase in rates of return. FPC in recent years has been granting most companies a 6% rate. Now some companies say they need more.

•

A Panhandle Eastern rate case may be a test of FPC's thinking. Panhandle is in the midst of examiner hearings, in which a major issue is an increase in the rate of return from 5¾% to 7% Other pipeline interests are carefully watching the progress of Panhandle's arguments, with an eye toward possible increases of their own if FPC allows a boost for Panhandle.

Panhandle cites the tight money market and an "unfavorable" investor opinion as requiring a higher rate of return. The company gets a lower yield on bonds, officers say, which leaves less for common stock investors. So potential investors look elsewhere. Panhandle has presented testimony that, over a three-year period, market prices of stocks of gas pipelines remained static while prices of gas distributor and electric utility stocks climbed. "It is the expected growth in earnings and capital gains—not merely present earnings—that motivates common stock buyers," a Panhandle official testified. Interest rates, he argued, are now higher than at any time since the passage of the Natural Gas Act in 1938.

FPC has been influenced by money market conditions in the past. The commission went as high as a 6½% rate of return in several cases in the 1940s, and allowed that rate once in 1957. Now FPC allows a rate of return between 5½% and 6¼%, with the average about 6%.

•

Watch for Congress to pass the controversial water pollution bill early this year—and then watch for a veto. The bill would double the amount of matching federal funds available to states and municipalities to combat pollution of rivers and streams. A House-Senate conference committee soon may settle on a $90-million figure and send the bill to the White House, where it faces a possible veto. The bill would ease local pressure on refineries, chemical plants, and others for anti-pollution programs.

•

Alaskan members of Congress will push again for an expanded oil and gas leasing bill in the 49th state. Rep. Ralph J. Rivers (D., Alaska) will sponsor a new bill this session, revised to meet the objections of last year's presidential veto. The 1959 measure would have raised the acreage limit in Alaska to 600,000 acres for both leases and options under a single holding. The Interior Dept. wanted the expanded limit—300,000 acres more than presently authorized—confined to development in northern Alaska. Rivers is expected to spell out the details of his new bill within a few weeks.

•

The Oil Import Appeals Board soon will start scheduling hearings on appeals by importing companies for higher allocations. (PW—Jan.8'60, p14). The deadline for appeals falls at the end of this week. At mid-week, more than 30 appeals had been received, and more were expected. Board members hope to hold hearings quickly once all appeals are in.

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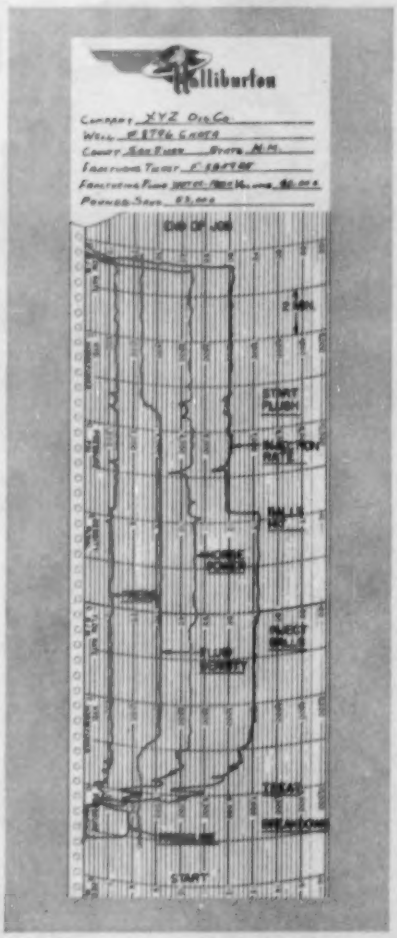

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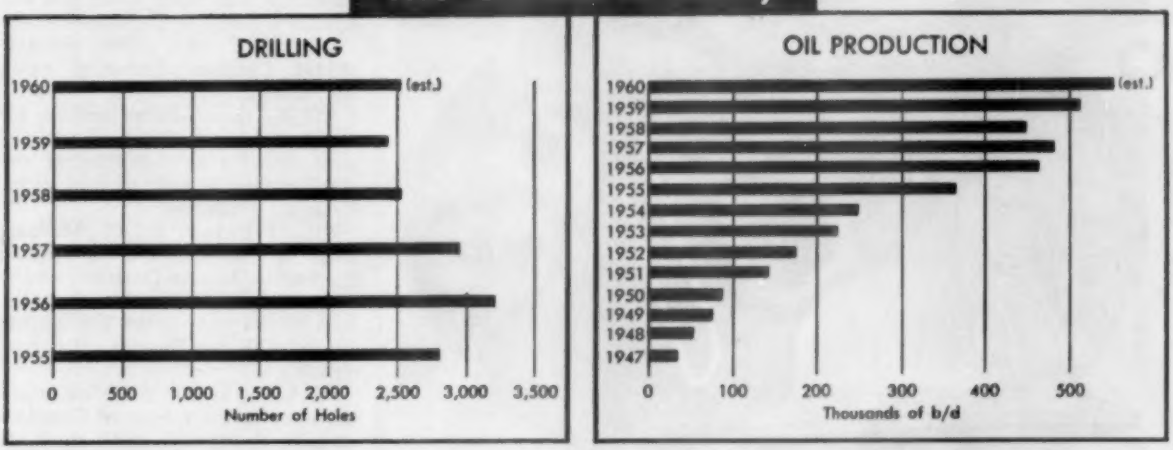

Gas May Lead Canada to a Big Year

Natural gas will play the key role in Canada's drilling and production this year.

Markets for Canadian natural gas have been increasing strongly over the past several years. Gas sales last year, for instance, rose 29% over the 1958 total.

This market growth is reflected in drilling statistics for 1959, when some 320 gas wells were completed. This compares with 200 completed in 1958.

Despite the big increase in sales, however, gas reserves still far exceed current demand. It's estimated there are more than 1,000 capped gas wells in Alberta alone.

The over-all prospects hinge most heavily on pending applications for export of gas to the U.S. Approval would touch off a vast program of capital expenditures.

Hearings on five export applications by U.S. and Canadian companies began last week before the National Energy Board. These applications call for export to the U.S. of more than 850-million cf/d of gas (PW—Dec. 18'59,p29). A decision by NEB is expected in about a month.

If the approvals come through, as expected, roughly $700-million will be spent over the next several years.

The additional gas exports would also mean an increase in annual gas revenues of about $30-million—revenues sorely needed by many oil companies to offset the adverse effects of inadequate markets for Canadian crude.

There would, of course, also be a step-up in drilling for gas, and more activity in related industries.

The petroleum industry's views on the applications is reflected by this typical comment by Claude E. Peavy, of Britalta Petroleums, Ltd.:

"Export gas is an important factor, which can make up the slack in oil markets. There is a firm possibility of great drilling and exploration development for the petroleum industry in the wake of increased gas exports from Alberta."

But even if all the applications are rejected—a very unlikely prospect—natural gas will still show a good hike in sales this year.

The number of holes drilled this year in Western Canada is expected to total around 2,500, up slightly from 1959.

The estimated 2,450 holes drilled last year compares with 2,516 drilled in 1958 and the approximately 3,200 drilled in 1956, the peak year.

Completions, however, showed a modest gain in 1959, hitting 1,700, compared with 1,640 in 1958. The decline in total drilling showed up in the number of dry holes: 760 were drilled in 1959, 876 in 1958.

An increase in the number of holes drilled this year, however slight, would be the first upward movement in four years. And there are signs that by next winter drilling will be on the verge of a strong upward drive.

Crude production is expected to increase at least 10% this year over 1959's average of 505,000 b/d.

The 1959 average itself was 11% better than 1958, a good increase by most standards.

Another 10% hike this year would lift production above 550,000 b/d. Current crude production, however, is still less than half of producibility.

The expected increase in crude output is based chiefly on increased refining capacity in the Ontario market area.

Ontario refiners took about 20% more domestic crude in 1959 than they did in 1958, some of it at the expense of imported crude.

The increase in Ontario is considered an indication that efforts are being made by refiners to meet some of the Borden Commission recommendations.

The commission last year recommended that the industry develop additional markets for Canadian crude to bring the domestic production level up to 700,000 b/d by the fall of 1960. It also recommended the supplanting of some foreign crude and the increasing of markets in the U.S.

Canadian refiners used an average of 735,000 b/d in 1959, with domestic crude showing a 13% increase, and imported crude 8%.

But there are still about 55,000 b/d of foreign crude, refined in the Montreal area, which are moving into the Ontario market.

Another big hope for the year is that the U.S. Puget Sound area will become a much bigger market for Canadian crude.

Canadian exports to this region averaged near 35,000 b/d in 1959, a

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hike of more than 40% over 1958.

But Canadian crude is barely competitive in this area with crude from the Four Corners and from California, though it does undersell Venezuelan crude. Far East crude is cheaper, and remains a threat to Canadian exports.

John W. Proctor, general manager of the Canadian Petroleum Assn., says, however:

"While the long-term outlook for the marketing of Canadian crude is good, there is no indication of any major increase in 1960 oil markets for Canadian producers."

Alberta Premier E. C. Manning told the Canadian Oilwell Drilling Contractors Assn. in December:

"Within very recent times there has been an easement in the U.S. import quotas as far as Canadian oil is concerned.

"It hasn't to date made too much difference in the volume of Canadian oil going to the U.S. But I think we all feel that it is a step in the right direction, and time will tell how much of that market can be captured for Canadian crude."

Alberta Prospects Good

Alberta, which accounts for the major part of Canadian drilling and production, will generally reflect the national pattern this year.

Producing capacity in the province totaled about 835,000 b/d by year-end, up more than 50,000 b/d from 1958. Actual production, however, averaged only 355,000 b/d, compared with the 1958 average of 310,000 b/d.

Production in the province this year is expected to average from 390,000 b/d to 400,000 b/d.

The allowable for January this year was set at 439,758 b/d, up strongly from the 385,128 b/d allowable of last January. Advance forecasts indicate a slight drop in February, compared with the same month last year, with a more than offsetting increase in March.

Several areas are assured of good wildcat and development drilling in Alberta this year.

The big oil plays are likely to center in Swan Hills, Judy Creek, Edith Lake, Simonette River, Virginia Hills, Whitecourt, and Lobstick.

In the Swan Hills area, Home Oil Co. et al plan to drill at least 30 holes this year, a bit more than in 1959. The field, which some say may become Canada's largest, has estimated primary reserves of more than 300-million bbl.

Pan American Petroleum Corp. and British American Oil Co., Ltd., which have been active in the south

half of the field, also plan extensive drilling in 1960. This team also opened the promising Judy Creek area, a few miles south, where heavy drilling is now in progress.

Exploratory and development drilling is expected to mount in the Lobstick area, some 3 mi. north of Pembina, where Pan American, Texaco Exploration, and Pacific Petroleums, Ltd., brought in a well last year for 879 b/d of 37-gravity oil.

Several areas will be in the forefront of gas drilling, including Wildcat Hills, Jenner, Enchant, Calgary, Big Horn, Dick Lake, Brazeau River, Kaybob, Cessford, and Clear Hills, among others.

One drilling development of 1959 that is likely to carry though this year is the decrease in the number of medium-depth holes drilled, and increases in shallow and very deep holes.

Saskatchewan: Only Fair

In Saskatchewan, production continues at a good rate. But lack of significant discoveries in 1959 points to a slacking off of drilling this year.

In the matter of production, as related to producibility, Saskatchewan fares excellently. Last year's production average of 133,000 b/d represented about 75% of capacity.

The drilling picture is not so rosy. The absence of recent good field discoveries has already resulted in a big drop in preliminary exploration work to three crew-months at the year-end. There were 18 active crews at the same time a year ago. The number of rigs active in December (about 25, on the average) was nearly a third less than in the same month in 1958.

Expiration of 10-year leases will help offset the otherwise glum drilling situation. Much of the year's activity will hinge on the possibility of a really significant oil strike.

Most of the drilling is likely to be concentrated in the southeast corner of the province, as in 1959, with some good action also likely in the southwest corner.

B.C.: Excellent

British Columbia and the adjacent area of the Northwest Territories will be an outstanding exploratory area in 1960.

At least 50 rigs will be needed for work in northeastern B.C. alone in 1960.

This number was being approached as 1959 drew to an end.

The big Kotcho Lake and Petitot River gas discoveries of early 1959 are the basis for what is sure to be the biggest year in the search for oil and

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gas in this province. One group of companies, with Home Oil as operator, has begun drilling a couple of wildcats in the North Petitot area, now known as the Celibeta Lake area, just across the border from B.C. in the Northwest Territories.

The Peace River district in the northeast corner of B.C.; the Queen Charlotte Islands off the northwest coast; and the Fraser Valley, east of Vancouver, in the south, will be other areas getting wildcat play in 1960.

Heavy development drilling is likely to continue in the Boundary Lake oil and gas field, rapidly becoming one of the largest in Canada, in terms of size. The Milligan Creek area, judging from recent lease sales, also is due for good activity.

Provincial authorization of B.C.'s first crude pipeline lends added impetus for stepped-up drilling in B.C. this year.

A Mixed Bag

Other areas in Canada show a mixed pattern. Manitoba's oil production has reached the stage where yield is going down. Exploratory activity, however, showed signs of a slight increase as 1959 ended, with three crews operating, against none in the same month a year ago.

Production for 1959 fell to 14,000 b/d, compared with 16,000 b/d in 1958. It's likely this declining trend will continue through 1960, unless some significant new production is found.

Oil and gas exploration will continue in the eastern provinces, where interest has flared sporadically over the years.

The St. Lawrence Valley, the Gaspe area of Quebec, and a few spots in the Maritime Provinces again will see some action in 1960. Too much isn't expected, however, but the incentive to find gas or oil is perhaps as great as anywhere in Canada. And the signs of some success are reasonably favorable.

The Great Lakes play will again be a highlight, with shallow drilling for both oil and gas in Lake Erie the center of interest.

Exploration is just getting off the ground in the Far North, including the Arctic Islands.

Several key wildcats in this area will determine the short-term drilling outlook. One of these wildcats is above the Arctic Circle, only about 175 mi. south of the Arctic Ocean.

But the general feeling is that it will take from 10 to 15 years to make the Far North an important oil province.

Oklahoma's first . . .

Commercial 'Fireflood' Set

Final preparations for Oklahoma's first attempt to recover hydrocarbons commercially by in-situ combustion are scheduled to start soon.

A. R. Venuto, president of Thermal Recovery Corp., the firm making the venture, told PETROLEUM WEEK that four wells in the initial five-spot pattern have already been drilled and cased.

The company plans immediate completion of the fifth well, plus the drilling and equipping of a gas well to provide fuel for compressors.

Air injection and ignition of the producing formation probably will start in early spring, after compressor equipment, tank batteries, and gathering lines have been installed.

Approval for the project, which is located in the old Seay field, Jefferson County, was granted last week by the Oklahoma Corporation Commission.

At the hearing before the commission on Dec. 23, Thermal Recovery requested capacity allowable and exception to Rule 206 of Oklahoma's General Rules & Regulations.

The exception to Rule 206, which requires surface pipe to be set and cemented through all domestic water supply levels, was granted, since the company is setting production pipe to the top of the pay and is circulating cement to the surface in each of the wells.

Oklahoma normally grants capacity allowable to all secondary recovery projects.

Thermal Recovery Corp., which is conducting the operation, plans to develop its 245-acre leasehold by drilling on 7½-acre inverted five-spot patterns.

Air injection and ignition will be made at the center well of each pattern, with production coming from the corner wells as the fire front progresses.

The initial development plot is situated on a tract encompassing slightly less than 100 acres on a high bluff overlooking the Red River (the boundary between Texas and Oklahoma). The remainder of the acreage is in the river bottom.

The company estimates that it will be able to recover approximately 100,000 bbl. of oil from each of the 7½-acre plots.

Wallace D. Hammer, consultant retained by Thermal Recovery, figures that about 70% of the oil in place can be recovered by in-situ combustion, with the remainder being consumed in the process.

If all goes well, development of additional plots will be initiated soon after production is achieved from the first plot.

Tentative plans call for drilling on a second plot immediately north of the first, with a third plot to be located west of the second.

All plots will have common edge (corner) wells.

Combustion will be in the Lower Cisco sand of the Pennsylvanian, found at a depth of about 850 ft.

Oil accumulation in the Lower Cisco in this immediate area is believed to be at the updip edge of a sand body occurring on the flank of a partially truncated anticline.

Hammer says the reservoir sand has an average porosity of about 2.85% and an average permeability of about 1,200 millidarcies. Sand thickness in this area averages 34 ft. of effective pay. The crude is 24-gravity.

The gas-oil ratio is 50:1, and the viscosity of the crude at reservoir temperature is about 244 centipoises. The proportion of connate water in the reservoir is about 35%.

Hammer notes that the high viscosity and low mobility ratio of the crude make waterflooding impractical.

The company plans to drill a gas well to the Upper Cisco to provide fuel for its air compressors.

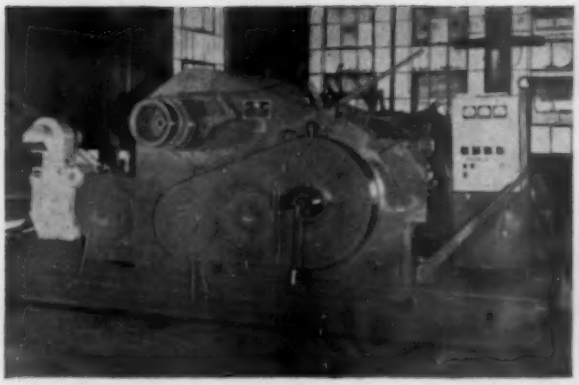
The gas section, which is topped at around 700 ft., is effectively separated from the Lower Cisco by an impermeable shale section that ranges up to 55 ft. in thickness.

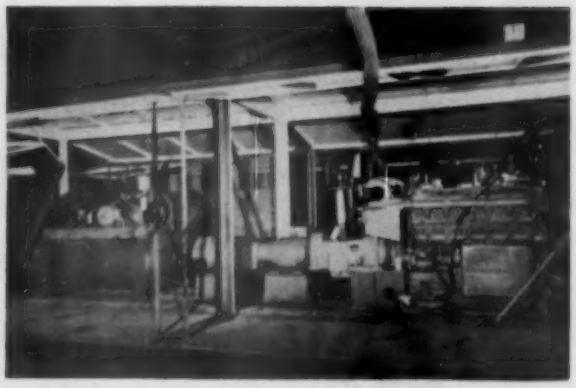
A pair of two-stage compressors will be installed, each of which will be driven by a 200-hp. gas engine.

Thermal Recovery estimates that about 3-million cf/d of air, discharged at pressures of about 300 psi., ultimately will be required to support the fire front on each plot.

Two previous in-situ combustion projects have been conducted in Oklahoma, but both were experimental operations.

One, in the southern part of the state, was conducted by Magnolia Petroleum Co. (now Mobil Oil Co.). The other, in the northeastern part, was conducted by Sinclair Oil & Gas Co. Both were pilot projects made for research purposes, and both have been completed.





MID-CONTINENT drawworks with motor (left), generators, diesel engine, and compressor unit (right) are key components of first . . .

All-Electric Rig for Medium Depths

The first diesel-electric rig to be designed specifically for medium-depth drilling has been delivered to Slats Honeymon Drilling Co.

The rig, assembled by Unit Rig & Equipment Co. at its Tulsa plant, is designed around Mid-Continent Supply Co.'s U-36-A drawworks, a relatively recent addition to the company's line.

The mast is a 129-ft. Lee C. Moore jack-knife type.

With the rig, Honeymon says, he will be able to "economically drill a 5,000-ft. hole, or go to 9,000 ft. without difficulty."

Initially, the rig will be outfitted with 4½-in. drillpipe. It will be put to work in western Oklahoma.

Later, says Honeymon, it may be equipped with 3½-in. drillpipe for slim-hole drilling down to 12,000 ft.

"This is the first time," he points out, "that a diesel-electric rig has been scaled down for medium-depth drilling. Always before, they have been economical only for deep drilling."

Lowered maintenance, increased flexibility, and faster rig-up time are the main objectives Honeymon believes will be achieved with the new rig.

"I see no reason," he says, "why the factors that make diesel-electric attractive for deep drilling should not be equally advantageous on a smaller rig.

"I believe I can cut my rig-up time by 30%, get into tight locations better and faster, and lower my maintenance costs by eliminating all the moving parts that characterize a standard rig."

The rig is said to have an unusually high degree of flexibility by having the engine-generator sets assignable to either or both motors.

The power package consists of one General Electric GE-752-R1 electric motor to power the drawworks, an identical motor to power the mud pump, and two generator sets consisting of GE's GT-60241 generators powered by two Cummins VT-12-I diesel engines.

By switching to the indicated position on the control console, the following functions are available:

- DW—generator assigned to drawworks motor with braking action when the throttle is turned off.
- RT—generator assigned to the drawworks without electric braking when the throttle is turned off.
- MP—generator assigned to the pump motor without braking action.
- MP+RT—generators assigned to both motors in parallel, with speed controlled by the pump throttle. Each motor draws current and produces torque in proportion to its load.

When the generators are split—one assigned to the pump and the other to the rotary—respective throttles control speed independently.

Variable speeds are available for both pump and drawworks motors for any given throttle setting and load.

The pump motor has two speeds, with "high" about 25% faster than "low." The speeds are selected by the mud pump motor switch on the console.

The drawworks motor has three speeds, all of which are controlled by the DW motor-speed selector switches. "Intermediate" is 20% to 25% faster than "low," with another 20% to 25% increase in the "high" position.

The motor-speed selector switches serve to adjust rotary speed relative to pump speed when one or both generators are compounded on the pump and rotary.

Thus, by shifting the pump motor to "high" and the drawworks to "low," the rotary runs slower than the pump.

When both motor speed switches are in "low," the motors run at the same speed. And when the pump motor is in "low" and the drawworks motor is in one of its two faster speeds, the rotary runs correspondingly higher than the pump.

During normal drilling, the driller has a choice of four rotary speeds for any given pump speed, and can divert maximum power from both engines to the pump with a proportionately smaller amount going to the rotary.

This factor allows for much greater pump capacity than normally would be expected for the rig's horsepower range.

With either engine down, the driller can come out of the hole with about 27,000 lb. single-line pull in "low." Or it is possible to rotate and circulate at reduced power with one engine. When power requirements are low, one engine can be shut down to conserve fuel.

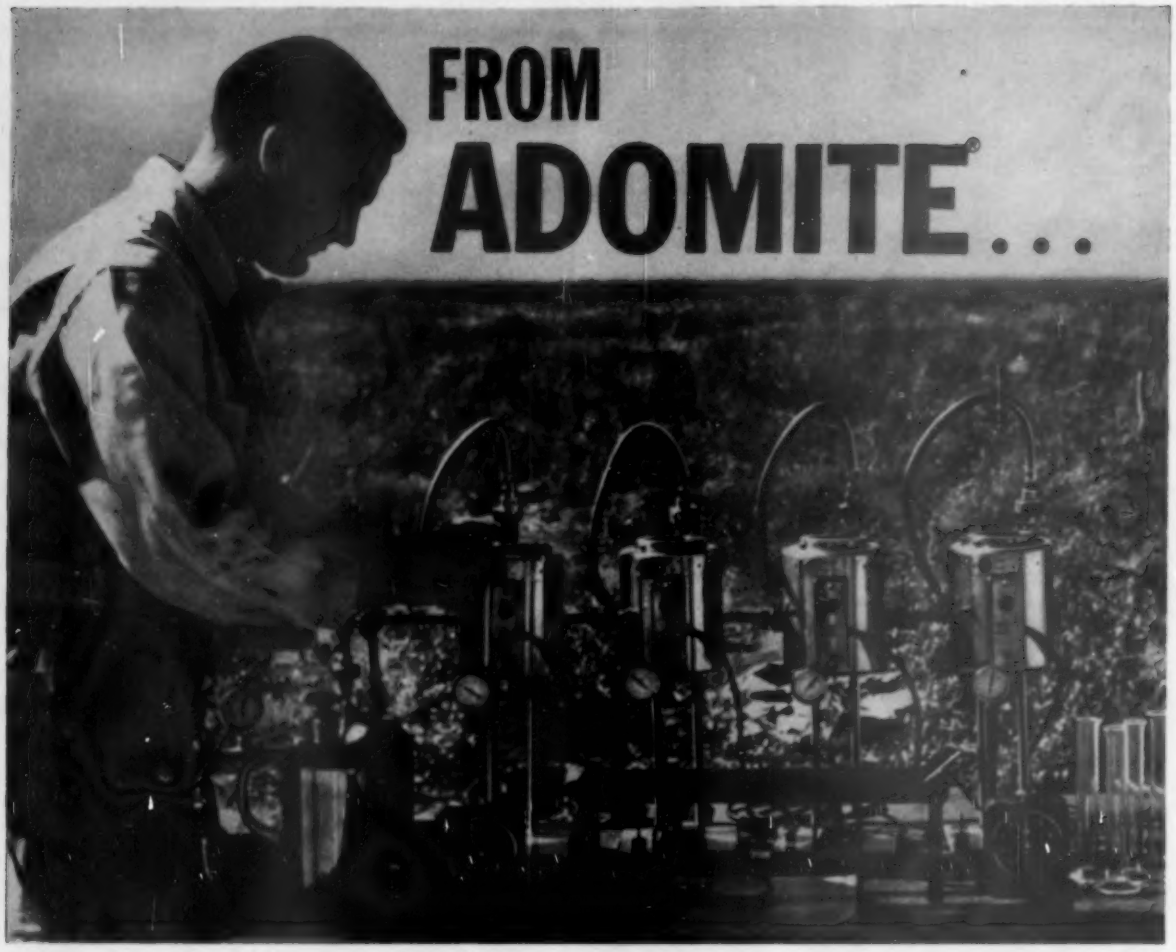
The electric system is designed to provide complete control for auxiliary and emergency operations from the driller's console.

Electric cables contained on a skid with the main control panel are permanently connected. All other cables are plug-in, quick-disconnect types.

A "drill-hoist" switch on the main control panel permits emergency operation of the rig in the event of damage to the console or its cables.

A manual cut-out switch on each motor is used to make the motor inoperative for safety while maintenance is performed on the drawworks or pump.

Meter indications are proportional to the torque and speed of the motors. Indicator lights signal loss of motor ventilation or an electrical fault



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in the system. The emergency "stop" button removes all power.

AC controls for auxiliaries such as shale shaker, water pump, air compressor, and lights are included in one end of the main DC control compartment.

Since either AC generator or exciter is adequate for rig requirements, the second unit represents 100% standby.

The AC light plant generator and DC exciter are expected to pull about 75 hp. from the engines, leaving about 675 hp. input to the drawworks for hoisting.

The rig also includes a unique air compressor arrangement.

The compressor, which provides air for the rig's clutches and controls, can be run by a small gasoline engine until enough air pressure is built up to start the main engines.

Once the main engines are running and electric power is being generated, the compressor is switched to an electric motor drive and controlled by a pressure switch.

Standard air throttles are used for drawworks, rotary, and mud pumps. Drawworks and rotary throttles are double-checked into the same air line to the control panel.

The rotary throttle can be set at a suitable low speed for cat-heading or spin-out during tripping. When the drawworks throttle is turned off, the motor decelerates at the low speed preset by the rotary throttle.

As Pressures Rise, So Do Pump Costs

A chart showing how the cost of pump parts increases in direct proportion to the pump pressure has been plotted by Mission Mfg. Co.

The information, which was plotted on a curve (chart), was derived from the testing of four different pumps operating at nearly full pressure for a total of 38,000 hours.

The pumps were tested, says Mission, at pressures ranging between 1,650 psi. and 3,500 psi.

Mission's aim in the cost study was to determine the relative operating cost of fluid end pump parts at various pump pressures and to use this information as a reference for drilling contractors.

The study shows that pump parts wear out nearly four times as fast operating at 3,500 psi, as they do at 1,650 psi.

In addition, the cost of replacing parts in pumps operating at 2,500 psi. is almost twice that of parts in pumps operating at 1,650 psi.

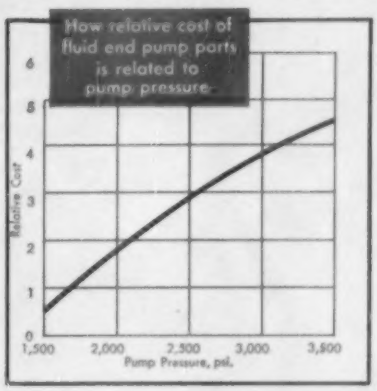
Mission officials believe the guide will aid drilling contractors in determining how much their costs will rise as they increase pump pressure or add more hydraulic horsepower to their rigs.

The information supplied by the curve, coupled with a knowledge of how much greater the penetration rate will be at higher pressures, will enable the contractor to determine what size pump is most economical for him to use, says Mission.

"By using this guide curve," says a Mission engineer, "the contractor can check his existing costs, compared to the cost of parts when using a larger pump, before deciding on which size pump to use."

The curve indicates that there are fewer failures with pump parts at lower pressures, Mission reports.

Thus the contractor must weigh the downtime for repairs, the cost of larger pumps, and increased cost of parts against the faster penetration rates gained by using larger pumps.



Costs of parts in pump operations at 1,000 psi. were used as a base for the study.

"The curve itself," says Mission, "represents a means between the relative cost of parts for the particular pumps involved and the equivalent of comparable parts for the 1,000 hp. pump," which is needed to operate at 3,500 psi.

It was assumed that the same service life was obtained at the operating pressures involved.

A company official points out that the direction of the curve below 1,650 psi. is questionable. But, he says, this is not important because costs are so low at these pressures that they are not significant.

The cost of fluid end pistons, liners, liner packing, and valves and seats is included in the cost factor.

Liner and rod life and resulting costs were determined by several factors, reports Mission, "since some of the parts were not completely worn out when we replaced them to keep conditions equal for comparative piston and rod packing tests.

"From numerous piston, liner, rod packing, and rod tests, we determined the rates of wear for rods and liners at the various operating pressures.

"From these rates of wear, we were able to determine the relative cost of the liners and rods. The relative cost of the other parts was generally determined based on life at failure or point of failure."

The costs do not take into consideration the need for discharge pulsation dampers or other increased expenses in maintaining the discharge system at higher pressures.

Nor do they reflect, says Mission, the actual dollar increases as a result of higher pressures, because the cost of parts vary in different areas of the country.

Mission analyzed pump log books and test record information, comparing regular material with experimental material to obtain service life data.

The test pumps and the hours they were tested are:

8¼-in. x 18-in. D-1000 Continental-Emsco, 1,000 hp., tested for 1,700 hours at pressures ranging between 3,000 psi. and 3,500 psi.

8-in. x 20-in. No. 220 Oil Well, 580 hp., tested for 12,000 hours at 2,000 psi.

7½-in. x 16-in. DA Continental-Emsco, 500 hp., tested for 5,300 hours at 2,000 psi.

7½-in. x 14-in. HP 1400 Wheland, 350 hp., tested for 19,000 hours at 1,650 psi.

The pumps were selected either by comparative bid or on a loan basis.

Average operating conditions were:

Mud temperature, 125F to 150F; oil content, 5% to 8% (diesel fuel, aniline point above 150F); sand content, 1½% to 3%; API viscosity, 40 to 50 per second; weight, 9 lb. to 11 lb. per gal.; and pump speed, 60 to 65 strokes per minute.

Mission says its "curve" is an outgrowth of work done at its Test Pump Laboratory (PW—Apr.11'59,p26).

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NORTH TEXAS. In Wilbarger County, a low-cost acidizing treatment—engineered using the "Acid Guide"—increased production from a show to 12 boph flowing, on a 16/64 inch choke. The well had been completed in the five-foot Canyon lime pay at about 3870 feet. Treatment consisted of a 500-gallon spearhead of BDA* (Breakdown Acid), followed by 2000 gallons Dowell acid injected at five bpm. Results compared favorably with much larger jobs in similar wells.

OKLAHOMA. In McClain County, an operator saved $2000 in treating materials when he had Dowell engineer a treatment with the aid of the "Acid Guide."

The well had been completed into the Hunton lime in a field where the most frequent treatment was 20,000 gallons Retarded Acid (acid-oil emulsion type). The

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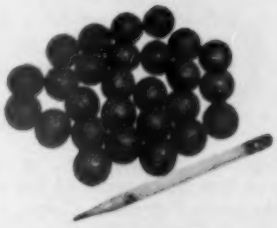
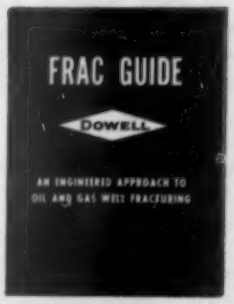


"FRAC GUIDE"*

This recent Dowell development makes possible unusually precise engineering of fracturing treatments. With the aid of the "Frac Guide" it is possible to select the most economical fluid, the correct quantities of fluid and sand, the optimum injection rate. Probable results can also be predicted with relative accuracy.



"Acid Guide" was used to see if desired results could be obtained with a less expensive job.

Calculations indicated that 12,000 gallons of fluid would do as well as 20,000. The actual treatment confirmed this prediction. The well went from one boph, pumping, to 10 boph, flowing. The operator considered this result highly satisfactory.

WEST TEXAS. An experiment was conducted on a well in the Strawn lime of Midland County to check the reliability of predictions made with the aid of the "Acid Guide." After a clean-up treatment using 360 gallons of BDA (Breakdown Acid), the well tested 27 bopd. Calculations made with the aid of the "Acid Guide" indicated that maximum penetration with *regular* acid could be obtained with 2000 gallons. A 2000-gallon treatment increased production to 53 bopd. An additional 4000 gallons of regular acid gave no production increase. Then, additional calculations using the "Acid Guide" indicated that greater penetration and more production would result from a treatment using 12,000 gallons of *Retarded Acid*. Following this last treatment, the well tested 84 bopd.

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What's New / IN EXPLORATION, DRILLING, PRODUCTION

The development and application of permanent-type well completion methods, and improvements in equipment and techniques for multiple completions, have been two of the most important means of cost reduction in the past ten years.

This is the view of T. A. Huber and C. B. Corley, Jr., both of the Humble Division of Humble Oil & Refining Co., who spoke this week at a University of Texas Petroleum Engineering Seminar.

Though significant strides in completion technology have been made, they said, the need exists for even more drastic and revolutionary developments.

•

Musgrove Drilling Co., a newly formed firm, has bought all the assets of Musgrove Petroleum Corp., a subsidiary of General American Industries. The sale involved 210 producing wells on 86 leases, mostly in Kansas, plus about 100,000 acres of undeveloped leases. Net production amounts to about 20,000 bbl. monthly.

•

Bids for leases on 9,000 acres of Federal land in Gubik gas field, Alaska, will be opened on Feb 24.

The 16 tracts being offered lie between the eastern boundary of Naval Petroleum Reserve No. 4 and the west side of a 16,000-acre area in the field that is already under lease.

Details and maps are available from Bureau of Land Management offices in Alaska and Washington, D.C.

•

The Texas Railroad Commission has increased from 300-million cf/d to 350-million cf/d the amount of gas that may be cycled in Tijerina-Canales-Blucher, Borregos, Seeligson, and Stratton fields of Jim Wells, Kleberg, and Nueces Counties.

The order applies to gas run through the Seeligson gas plant.

The commission said the added limit is necessary for flexibility in day-to-day operations of the huge new plant.

•

Lloyd H. Smith, Houston, is the principal buyer in the $4-million purchase of Zach Brooks Drilling Co. interests in Alabama's Citronelle field.

The sale called for a cash payment of $1¼-million, with the remainder coming from production payments.

The sale was made by the surviving partners in the Zach Brooks company —Chesley Pruett and E. L. Erickson —and by heirs of Zach Brooks, who died last April.

In addition to the transfer of interests in 43 wells, which now produce about 2,300 b/d, the sale includes 23 nonoperated units.

•

General Petroleum Corp. (now Mobil Oil Co.) has signed a unitization agreement for Fault Block II of the subsidence-stricken Wilmington field, California.

Seven pay zones in the fault block are included in the unit.

The upland portion of the fault block, which contains about 300 producing wells, will be unitized first. Other companies to sign the agreement will be Ford Motor Co., Union Pacific Railroad, and Southern California Edison Co.

Unitization will assure full-fledged water injection, which so far has been on a cooperative basis at the rate of 420,000 gal. daily.

•

The North Dakota Industrial Commission on Feb. 17 will rehear Hunt Oil Co.'s request for 320-acre temporary spacing in the area west of Tioga field, Williams County.

Hunt asks that 320-acre spacing be established for the development of a 30-sq. mi. area between Tioga and McGregor fields.

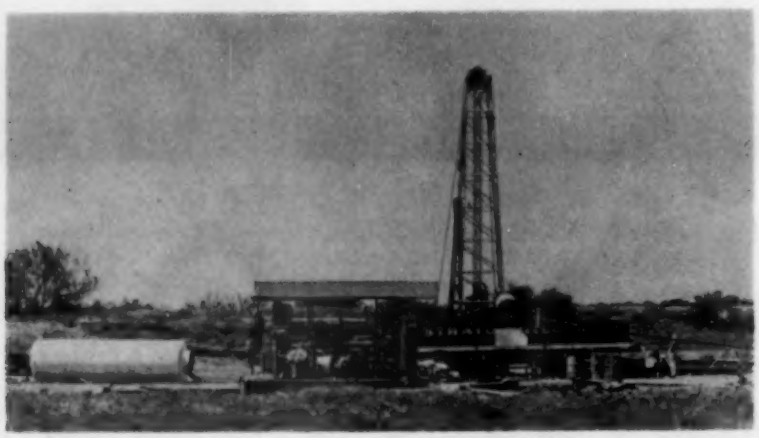
The oil is there, says Hunt, but it can't be recovered economically if more than two wells per section are required.

The commission in late October denied Hunt's original request (PW —Dec.4'59,p36). Since then, several leases in the area have expired.

•

About 29,891 acres of Montana state-owned land will be offered for leasing Feb. 2 in Helena.

The counties where the tracts are located, and the number of tracts in each, are: Rosebud, 11; Carter, 10; Musselshell, 7; Valley, 6; Dawson, 4; Wibaux, Sweet Grass, Stillwater, and Pondera with 2 each; and Blaine, Daniels, Glacier, Garfield, Liberty, Powder River, and Sheridan with 1 each.



Pipe Used Inside Pipe for Drilling

A dual, concentric drill string is used with this rig developed by Strato Drill, Inc. (PW—Mar.13'59,p60;Oct.9'59,p60). Reverse circulation is employed during drilling, with the drilling medium circulated down the annulus between the drill string pipes and up through the inner pipe. By using variations of core bits, the operators are said to be able to core continuously during drilling. The rig reportedly can use air, gas, or liquid as a circulating medium.

Drilling Highlights

Utah—Pure Oil Co. No. 1 Northwest Lisbon was completed for 586 b/d of 45.2-gravity oil through 14/64-in. choke and perforations in the McCracken (Devonian) at 8,261-93 ft. and 8,310-48 ft. The discovery, first in the Rockies to produce from this sand, is 36 mi. southeast of Big Flat field, which produces from the Mississippian. Nearest Devonian production is 500 mi. southeast, in Lea County, N.M.

Kentucky—L. H. Horn and A. A. Board No. 1 Garner, Clinton County, between Lake Cumberland and Dale Hollow Lake, 10 mi. north of the Tennessee border, flowed uncontrolled at an estimated rate of more than 400 bbl. of oil per hour before slowing down to "a trickle" four days later, when efforts were made to put it on pump. The discovery had been carried to 1,012 ft. in the Stone's River sand when it blew in. The well is 15 mi. southwest of the Wilson-Cooper well, drilled in 1931 in Wayne County. That well flowed up to 10,000 b/d for several days before settling down to 500 b/d for six months.

East Texas—R. J. Caraway and Pan American Petroleum Corp. No. 1 McCoy, James Cheshire survey, Van Zandt County, flowed at an estimated rate of 375 b/d to 450 b/d of oil from two zones and 2.1-million cf/d of gas with 50 bbl. of condensate per million from a third zone. Oil flowed from the Rodessa through perforations at 8,184-94 ft. at an estimated rate of 175-200 b/d of 42.4-gravity oil, and from the James through ½-in. choke and perforations at 8,286-93 ft. at an estimated rate of 200-250 b/d of 44.2-gravity oil. The gas flow was through 12/64-in. choke and perforations at 10,522-32 ft. in the Cotton Valley. Nearest Cotton Valley production is 90 mi. east, in Cass County. Operators plan to triple-complete the discovery, 4 mi. southeast of Fruitvale pool.

West Texas—Tres Oil Co. No. 1 Dilby Wallace, section 32, block L, H&TC survey, Kent County, recovered 2,250 ft. of oil and 250 ft. of oil-cut mud on drillstem test at 6,471-84 ft. in the Strawn, topped at 6,415 ft. A total of 3,953 ft. of oil and 1,680 ft. of oil- and gas-cut mud was recovered on four previous tests between 6,419-70 ft. Operator was drilling below 6,849 ft. in the Mississippian, topped at 6,760 ft., at last report. The wildcat, is 3½ mi. southeast of Boomerang Pennsylvania field.

North Texas—Bayview Oil Corp. and Carter-Gifford Oil Co. No. 1 W. T. Evers, M. E. Forrest survey, Denton County, was completed for 5.4-million cf/d of gas through perforations at 3,663-76 ft. and 3,680-86 ft. in the Cordell (Pennsylvanian). The discovery is 13 mi. southeast of South Bolivar field.

Colorado—Texaco Inc. No. 1 Govt.-Knowlton, section 10-4n-91w, Moffat County, was completed for 1,098 b/d of 39.9-gravity oil through 32/64-in. choke and perforations at 5,815-922 ft. in the Weber (Pennsylvanian). The discovery is in Moffat field, which produces from Cretaceous and Jurassic formations.

Montana—Vaughey & Vaughey No. 1 Kincheloe, section 35-11n-32e, Rosebud County, was completed on the pump for 145 b/d of oil through perforations at 4,957-65 ft. in the Tyler. The discovery is 2 mi. south of Northwest Sumatra field.

Kansas—Western Natural Gas Co. No. 1 Armstrong, section 24-30s-41w, Stanton County, was completed for 11.5-million cf/d of gas open flow from 5,008-28 ft. and 5,222-32 ft. in the Morrow. The discovery is 1 mi. southeast of Beauchamp field.

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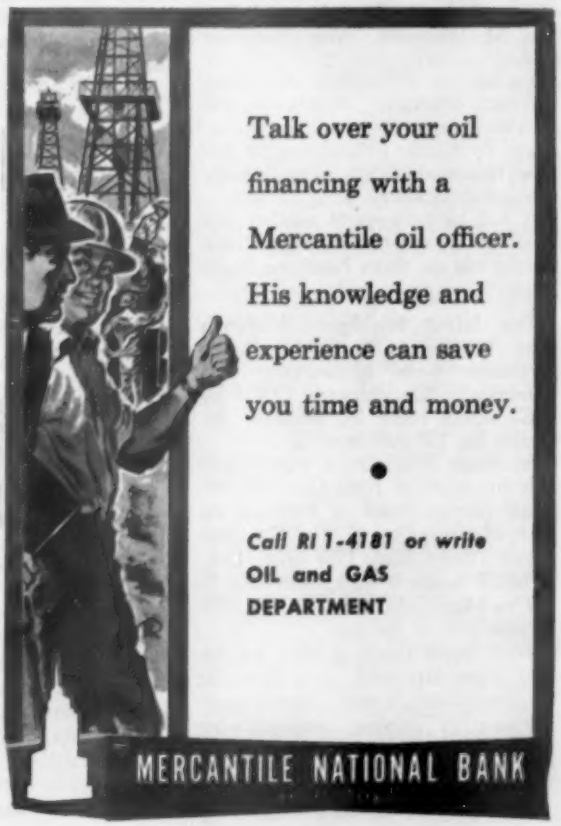
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Approval Seen for Midwest Gas Plan

Another expansion project, at a cost of $51,239,000, is planned by Michigan Wisconsin Pipe Line Co. to boost its natural gas deliveries into the Midwest by 175-million cf/d.

An application was filed with the Federal Power Commission last week.

Quick approval is seen. "There's nothing in the application that would hold it up with FPC," one observer says.

Main part of Michigan Wisconsin's new project is 528.9 mi. of loops along its main line, to cost $44,876,000.

The line extends from the Texas Panhandle, near the Oklahoma border, to near Chicago, where it forks to north-central Michigan and to Twin Rivers and Green Bay, Wis. (map).

Michigan Wisconsin plans to build 341.8 mi. of 24-in. loops on the section from Laverne Field to Earlsville, Ill., and 188 mi. of 30-in. loops between Joliet, Ill., and Austin Field, in Michigan.

The gas would come from two sources: Laverne Field, Okla., 100-million cf/d; Northern Natural Gas Co., at Janesville, Wis., 75-million cf/d.

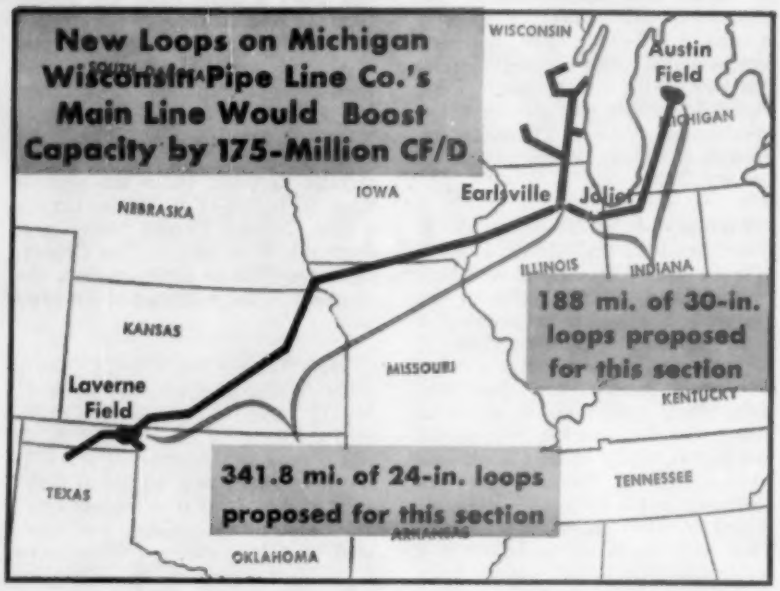
To tap the 100-million cf/d from Laverne, Michigan Wisconsin will have to increase its compressor horsepower by 6,000. In addition, it will have to spend about $2-million for new gathering lines.

It will have to spend another $4,363,000 for new connecting facilities to take the gas from Northern Natural.

This latest Michigan Wisconsin plan, together with proposed gas purchases from Midwestern Gas Transmission Co., already O.K'd by FPC, would raise its Midwest deliveries by 333-million cf/d.

Michigan Wisconsin is waiting now only for approval from Canada's National Energy Board of proposed exports of 204-million cf/d of Canadian gas by Trans-Canada Pipe Lines, Ltd., to MGT before it starts extending its line to Marshfield, Wis., to take 158-million cf/d of the gas.

NEB heard this and other gas import plans last week, and favorable decisions—though with possible modifications of original proposals—are expected in each case (PW—Dec.18 '59,p48).



Michigan Wisconsin's stepped-up deliveries into the Midwest from U.S. sources isn't expected to rekindle its former dispute with MGT for heavier slices of the market.

MGT and M-W were the main contenders in a four-year wrangle among several gas companies for bigger shares of the eight-state area.

Peace was made in midsummer, when the two companies first sought joint Federal Power Commission approval for the Canadian import project (PW—Jul.24'59,p34).

Main reason that this peace has been unruffled by M-W's newest proposal is that it's going to sell the 175-million cf/d to 11 of its present wholesale customers.

M-W reports that it has recently gained 14 new wholesale customers in Illinois, Iowa, Missouri, Wisconsin, and Michigan. Presumably, however, the bulk of their gas will come from M-W's purchases from MGT.

Tentative price of the Canadian gas is 25.3¢ per Mcf., plus a $4.75 monthly demand charge, as compared with 23.4¢, plus a $4.48 monthly charge, for gas from Northern Natural, and a flat 17¢ for Oklahoma gas.

The reason that the price of the Canadian gas is tentative is that FPC wants to know MGT's financing costs for its line from Canada before it sets a firm rate.

U.S. Tanker Owners Ask Ike's Aid

A presidential order that would guarantee charter-poor U.S. tankers 50% of oil imports is being sought by the Joint Committee for American Flag Tankers, a new labor-management group.

The appeal was made in a 91-page memo to the Office of Civil & Defense Mobilization last week.

The document supplements a plea to Congress last September for legislation that would provide the same guarantee.

The committee represents eight maritime unions—including the National Maritime Union and the Seafarers International Union—and twelve independent owners.

Unless the President comes to the rescue of U.S. tankers with the 50% imports guarantee, "an independent American-flag tanker fleet cannot be maintained," the committee warns.

The committee likens the plight of U.S.-flag tanker owners—especially independents owning only a few, small ships—to that of the domestic oil producers, who must compete with cheaper, foreign crude.

But, it admonishes, "the situation

of the tanker owner is far more drastic."

Since 1948, the percentage of imports carried by U.S. ships has dropped from 76% to well under 5%, the committee says.

The import charter outlook for several U.S. tanker owners—mainly small independents—is growing drearier daily.

Petitions in bankruptcy already have been filed by six members of the committee, reports Richard W. Kurrus, its general counsel.

And "more will follow," he cautions, unless executive action comes quickly.

While presidential action is uncertain, the Maritime Administration has a plan to help the tanker owners: Treasury loans to meet mortgage payments of shipowners on government-backed loans.

A bill to permit the Administration to tap the Treasury for this purpose is now being readied.

With its own money, the agency has had to help bail out Red Hills Corp. of Jacksonville, Fla. On Oct. 24, it made a $65,000 quarterly principal payment to Bowery Savings Bank, in New York, on the 20,000-ton tanker Goldstream.

But on Dec. 24, Red Hills failed to make another quarterly payment—this one of $100,000. It has a "grace" period in which to make this payment, which expires Jan. 25. The probability is that Maritime will again step in if the company finds that it can't come up with the full amount by that date.

Meanwhile, the agency is worried about $97.7-million it has underwritten on ten other hard-hit tankers under Title XI of the Merchant Marine Act of 1936. If these ten tankers run into financial difficulty, it may deplete the agency's funds. That's the reason Maritime wants an assist from the Treasury.

Labor is as hard hit as are owners by the shrunken charter market. There seems to be some confusion, however, over the role of labor in drafting the petition.

One maritime union newspaper reports that, should a quota be imposed, it would spur transfer of U.S.-owned tankers from Liberian and Panamanian flags to American registry. Thus, more jobs would be provided for U.S. seamen.

On the other hand, the petition reportedly asks that the quota apply only to vessels that never sailed under a foreign flag.

Also, to qualify for the benefit, a tanker must not only be under U.S. registry, but must be 75% owned by U.S. citizens.

Even though the cost of transporting the additional imports by U.S.-flag tankers would be considerably higher than it would be by foreign ships—chiefly due to much higher labor charges—the price of products to the consumer wouldn't rise, the committee contends.

Moreover, it says that the proposed regulation would benefit the consumer and the country by assuring that there would be no shortage of U.S. tankers in an emergency.

What's New / IN PIPELINES

The Texas Supreme Court last week rendered a decision that's expected to save gas pipeline companies millions of dollars: It ruled that relocation costs during interstate road work must be paid from state-federal funds.

The question of who should bear such costs—the pipeline owner or the government—has been a tough legal nut ever since the day lines and roads first crossed.

This latest decision may have cracked it, at least in Texas. A rehearing appeal by the state highway department is expected to be denied.

The ruling upholds 1957 state legislation ordering state reimbursement for relocation.

The case in question involved Lone Star Gas Co. and Union Gas Co. and the cities of Dallas and Austin, as well as a telephone and a power company.

Highway officials contended unsuccessfully that such payments violated the state constitution.

•

Alberta & Southern Gas Co.'s plan to export 458,750,000 cf/d of Alberta gas to the U.S. West Coast has met some surprise resistance.

In an unexpected move at National Energy Board hearings last week, the British Columbia Chamber of Mines protested that approval of the exports might rob the province of its biggest potential gas market. And the Yukon Chamber backed up the protest.

A&S's proposal is part of a bigger project, the backbone of which is a $331-million pipeline from Alberta to San Francisco to deliver 654-million cf/d into the U.S. (PW—Dec.18'59, p48).

All of A&S's gas would come from Alberta, however. And that's the rub.

The British Columbia group contends that committing only Alberta gas to the U.S. market could put its own fields in a "deep freeze" for many years.

Hearing observers, however, feel that British Columbia's protest is only a token, made presumably to keep its foot in the export door that the new NEB is expected to open wide.

Meanwhile, the Alberta Gas Conservation Board has recommended approval of a boost in exports by A&S and West Coast Transmission Co., to cover pending 25-year contracts with U.S. importers.

•

The Federal Power Commission has O.K.'d the installation by Columbia Gulf System, Inc., of a jet-engine-driven compressor on its main line, at Clementsville, Ky. (PW—Dec.30 '59,p43).

A special turbine to harness the jet power was designed and built by Cooper-Bessemer Corp. Power will be provided by Pratt & Whitney Aircraft Corp. J-57 jet engine (PW—Sep.11 '59,p42).

•

Work is under way on the $17.3-million pipeline of Pacific Lighting Gas Supply Co. to carry an additional 300-million cf/d into southern California.

The gas will be supplied by Transwestern Pipeline Co., which is building a 1,300-mi. line from West Texas to a connection with Pacific Lighting's line on the California state line near Needles, Ariz.

Both lines are being built for expansion to a capacity of 640-million cf/d.

•

Britain's nationalized gas industry is pressing a search for strata suitable for gas storage.

Goal of the industry is a nationwide storage grid, if suitable formations can be found.

As a starter, three experimental bore holes will be sunk to a depth of 2,000 ft. near Winchester, Hampshire County. The Gas Council is looking for porous rock strata; it's not planning to excavate caverns.

Esso Speeds Pipe for Libya Line

Libya's new-found oil may start moving into world markets even earlier than expected. One new indicator last week: September delivery is set for 30-in. pipe—100 mi. of it—for Esso's pipeline from Zelten in north-central Libya.

The $4-million contract for the steel pipe is the first actually awarded for a Libyan pipeline. It was won by South Durham Iron & Steel Co., Ltd., of Britain, which announced that it will start manufacturing the pipe in April.

Confirming the award, Esso said it had placed the order "in light of a possible short world supply of steel pipe," adding that the exact route and terminal for the projected line haven't yet been determined. Decisions on these points, it said, are awaiting studies now being conducted on the economics and practicability of various terminal sites and crude-handling procedures.

Esso hopes to have adequate information by mid-year to evaluate the potential of the Zelten discovery area on its Block 6.

It has now completed four successful tests on the structure. The No. 4 Zelten, completed last week, produced 2,500 b/d of 39-gravity oil from a section at 5,700-918 ft. (PW—Jan.8'60,p40). Esso lists the test rates for the previous Zelten successes as 1,600 b/d for No. 3, 15,000 b/d for No. 2, and 17,500 b/d for the No. 1 discovery.

These discoveries, the company says, have been "very promising"—as indicated by these "published" test results.

One rig is now active on a Zelten outposting in a program to define the structure and determine its future potential.

The next test, No. 5 Zelten, will be drilled 4 mi. northwest of No. 1. The three previous wells are southeast, and southwest of No. 1.

Hopes that north-central Libya's oil prospects may be extended farther south were also boosted last week: Good oil and gas shows were found in the Conorada group's current wildcats on Block 59, drilled by Oasis Oil, operator for the group.

An initial test south of Zelten on this block was dry. One of the current tests, B-1-59, still farther south of Zelten, is now being drilled ahead near the southern boundary of Block 59. This test recovered 27 bbl. of 29.4-gravity oil from a section between 5,530-74 ft., and 34.7-gravity oil was found in a section topped at 5,601 ft. Numerous gas shows were also encountered between 5,490-604 ft.

The other current wildcat, C-1-59, is now being drilled below 5,218 ft. at the western end of the block after recovering 3,150 ft. of gas-cut mud on a test. The site is 5.6 mi. south of the Block 47 Beda discovery by the Caltex group's American Overseas Petroleum.

So far, five companies have established at least one discovery each on five blocks in north-central Libya, within the yet-undefined limits of the Sirte Basin. This is the area that holds the greatest promise of catapulting Libya into the ranks of the world's major oil provinces. Less-dramatic discoveries also have been made on five blocks of western Libya.

Esso's Zelten discoveries on Block 6 are the biggest in the Sirte Basin so far. Oasis Oil has four oil wells so far on Block 32, with test rates adding up to about 11,200 b/d. It also has two gas finds on that block. The other discoveries were made by Amoseas on Block 47, Libyan American Oil Co. (Texas Gulf Producing and W. R. Grace) on Block 17, and Mobil Oil on Block 12.

Ten wildcats are currently being drilled in the area, on these blocks and others.

- Esso has two rigs on Block 6, in addition to the one it is using on the Zelten structure. One is at work at Et Tual, 42 mi. from the coast, in the northeast corner of the block. Esso has just suspended drilling with the other at 11,149 ft. in the Tedma test, about 50 mi. northwest of Zelten.
- Oasis Oil is drilling four of its ten current Libyan wildcats on Block 32. These are the A-2-32, B-6-32, F-3-32, and K-1-32. The company is currently Libya's most active wildcatter, and expects to bring in another two rigs in a couple months.
- Amoseas is drilling No. 3 Beda on Block 47, southeast of its No. 2.
- Libyan American is drilling C-1-17 on Block 17. This tract will be included in the recently approved farmout agreement with Esso, which will earn a 50% interest in the company's acreage.
- Mobil Oil, which has a German partner, is drilling two tests. One on Block 11 is C-1-11 at Dar El Musggaf, 30 mi. east of Oasis Oil's Dahra discovery. The other is the Hagfa A-1-13 on Block 13. This is now being drilled below 7,900 ft. after finding shows of 12-gravity oil at 7,400 ft.—heaviest in Libya to date (PW—Jan.8'60,p41). Virtually all the oil found in the country so far has ranged upward from 34-gravity, to as high as 47.

165 Clauses—All Over Again

Industry-labor negotiations on a new Venezuelan oil labor contract were resumed in Caracas last week—virtually right back where they started last October.

All 165 demands in the labor unions' draft contract—including 96 social-service clauses—are back on the bargaining table, to be hammered out one by one. Altogether, they would add an estimated $1.2-billion to oil companies' labor costs—and would quadruple present costs.

The full turn of the circle follows the government's decision to reverse its earlier plan to take over costly educational, health, and other social services now performed by oil companies for their workers.

Such a takeover requires thorough planning and is not practical "at this time," an interministerial commission announced in late December. It said, however, that the program will be reconsidered, possibly before the termination date of the new contract.

Now that union demands for even costlier social services have landed back in the companies' laps, one union leader's prediction of a contract settlement this week appeared more than optimistic. The Venezuelan Oil Workers Federation rejected the oil industry's first set of counter-proposals in November.

New Constitution Could Affect Oil

(A report from PETROLEUM WEEK*'s Caracas Bureau)*

CARACAS—Oil pipelines may be regulated as public services in Venezuela. That's one possible effect of a new draft constitution that could affect various phases of oil industry operations.

The new draft constitution is due to come up for debate in Congress this month.

The pipeline provision is included in 17 draft articles in a proposed chapter on "economic rights." A congressional Joint Commission on Constitutional Reform has approved all but two of the 17 articles.

The intent of many of the draft provisions is still unclear. But oil companies think the pipeline provision may infringe on concession rights.

They are also concerned over inclusion of roads, which oil companies have built and maintain for their own use.

Article 10 states that "railroads, roads, oil pipelines, and other means of communication or transport built by companies which exploit natural resources will be at the service of the public under the conditions and within the limitations which the law establishes."

Oil Minister Dr. Juan Perez Alfonzo, on the other hand, says the article "would have little practical effect" on the status of pipelines.

At present, owners of pipelines are obliged to transport oil for others only if they have spare capacity available. In such cases, conditions and tariffs are subject to approval of the Ministry of Mines & Hydrocarbons.

Other provisions potentially affecting the oil industry would incorporate a series of economic policy directives into the new constitution.

Article 5 in the chapter on "economic rights" declares that the state will protect private initiative. But it adds that this is "without prejudice to the faculty of dictating measures to plan, rationalize, and foment production, and to regulate the circulation, distribution, and consumption of wealth, in order to stimulate the economic development of the country."

Article 4 specifically authorizes the granting of concessions "of exclusive character and for limited time, for the establishment and exploitation of works and services of public interest." (Present executive policy, however, is to grant no new oil concessions, and observers feel the political mood of the country would make it difficult to change that policy in the foreseeable future.)

Article 12, which was referred to the Foreign Ministry for consultation, provides that "confiscations will not be decreed or executed except in the instance of foreigners, in those cases accepted by international law."

One article authorizes the establishment of government monopolies—which in itself is not new. The Venezuelan government has always retained some monopolies, such as salt production.

In the new draft, Article 6 specifies that the "State may reserve to itself certain industries, exploitations, or services of public interest, for reasons of national convenience."

The government already is active in petrochemicals, steel, natural gas distribution, electric power, hotels, and other businesses. But so far, private enterprise has not been excluded.

The possibility of a government monopoly to liquefy methane apparently may be considered by the newly created National Energy Council. At a press conference, Dr. Perez Alfonzo was asked if the government is contemplating such a monopoly. His reply: It is a question whether gas, at the low prices being offered currently, can be put to better use by marketing it or by reinjecting it to increase oil recovery.

In order to market the gas, he observed, Venezuela would have to commit itself to supplying a specified quantity of gas over a period of years. His Ministry is referring the question to the National Energy Council for decision, he said.

The draft provisions also call for development of natural resources "primarily for the collective benefit of Venezuelans" in Article 14, which was referred to a subcommission.

This could have some far-reaching effects on oil company operations, at least in the present form of the provisions it includes.

Paragraph 2, for example, states that in the development of natural resources, the "execution and direction will be in charge of Venezuelans, with the exception of cases determined by the law for reasons of a technical nature."

Paragraph 5 provides that the State "will create and maintain a basic heavy industry, controlled by national, Venezuelan capital."

It also requires that "exploitation companies organized with foreign capital should facilitate the collaboration of national capital, and make possible the sale of shares in the national market." At present, most Venezuelan oil companies are entirely held by their parent firms outside Venezuela. Creole Petroleum and Talon Petroleum are the only ones that list their stock locally.

Additional paragraphs of the same article establish general directives for international economic policy:

Paragraph 6: The State "will try to avoid dependence on one sole market in the development of international trade."

Paragraph 7: "Establishment of joint companies with other Latin American countries, for intercontinental transport as well as for processing of primary materials produced in Venezuela."

Majors Realign in Turkey Refining

Three majors—not four as originally planned—will own Turkey's 65,000 b/d Mediterranean refinery, for which the cornerstone was laid at Mersin last week.

The new ownership lineup was disclosed in an announcement by Mobil International, which now has a 56% stake in the $50-million project. Royal Dutch Shell has 27%, and British Petroleum Co. 17%.

Foster Wheeler, Ltd., will build the plant, which will be the second in Turkey when it goes on stream in the latter half of 1961. (The existing one is a small government unit inland in the southeast, which is now being expanded to 6,000 b/d). It handles crude from a couple of small fields, Turkey's only production so far.

Caltex dropped out of the project following its recent pact to finance and build a 20,800 b/d government refinery near Istanbul (PW—Nov. 6'59,p112). Unlike Mersin, this is itself an important Turkish consuming area.

Initially, Caltex will have a 49% interest in this $25.7-million plant. Caltex will operate the plant for ten years from a guaranteed on-stream date in January, 1962; then sell its share to the government. Caltex is to supply the crude at competitive prices, while product output will be marketed by its Turkish distributor.

What's New / AROUND THE WORLD

INDIA—The Indian government has set Jan. 31 as the date for foreign oil companies to submit "indications of interest" in exploration under its revised oil rules (PW—Dec.4'59,p52).

They're to be forwarded with a statement of qualifications to the Ministry of Steel, Mines & Fuel. Specific proposals may be made later, with agreements subject to negotiation.

•

ISRAEL—The two companies that established Israel's only oil production will merge and issue new $3 shares in the U.S. to finance further exploration. Lapidoth Oil and Israel Oil Prospectors will become Lapidoth-Oil Prospectors. So far, they've invested $16-million in exploration, and in drilling of the Heletz fields.

•

CUBA—Gulf Oil Corp. this week went on record as the first company to announce its withdrawal from Cuba due to the restrictive new oil law passed in November (PW—Nov. 27'59,p13).

Gulf said it had spent $7-million in 14 years of exploring in Cuba. (It had no refining or marketing interest there.)

The new law nullified its concession rights and the petroleum law that governs them, the statement added. Together with the "existing highly unfavorable climate for private enterprise in Cuba," the law makes further operations "impossible" and forced the decision to "cancel plans for future drilling and completely withdraw from the country."

•

JAPAN—Soviet oil may spell stiffer competition for Japan's traditional oil suppliers this year. Soviet trade negotiators are expected to offer low prices in efforts to boost oil sales to 1-million tons for 1960.

The target last year was only 100,000 tons, but actual Russian shipments to Japan ran over that, to 116,000 tons—92,000 crude and 24,000 fuel oil.

•

SPAIN—Banff Oil Ltd., of Canada, plans to start drilling in March on acreage in Spain held by a Spanish company in which it has purchased an interest. W. H. Mohag, Jr., has resigned as president of the Calgary firm to direct operations of the Barcelona-based company, Soc. Investigadora Petrolifera S.A.

•

INDONESIA—Draft oil legislation aimed at tightening state control over oil operations was resubmitted to Parliament last week by the Indonesian government.

It apparently contains few modifications of the version submitted last year (PW—May1'59,p48), according to reports immediately available. That draft provided for termination of existing oil rights within 30 years but also left the door open for new grants.

•

IRAN—The Canadian-owned Sapphire Petroleums, Ltd., has been given another two months to start exploration on the oil rights it was granted in 1958 under a joint venture with National Iranian Oil Co. (PW—Sep. 4'59,p45).

According to reports from Teheran, the agreement forestalls forfeiture of Sapphire's guarantee. Its acreage totals 1,000 sq. km. in two blocks along the Gulf of Oman.

•

ALGERIA—Four new Sahara tracts—all requested in 1958—were awarded last week to affiliates of Cities Service and British Petroleum.

Cities Service's Afropec and its two French partners won five-year grants on a total of 2,740 sq. mi. in three permits (Krobna, Hassi Berkane, and Gueddich), two of which adjoin their previous acreage. The investment obligation is $2.4-million.

Soc. des Petroles de Valence, owned 50% by BP, got the 463-sq. mi. Erg Barga permit at Toggourt for three years with a $600,000 investment commitment.

•

WEST GERMANY—German crude production climbed 12½% in 1959 to a new high. But it faces stiff competition from imports after 1963 when it loses its tariff protection under the European Common Market agreement, the German oil industry association points out. The association places 1959 output at 5.1-million tons, slightly better than expected, and predicts further modest gains to 5.6-million tons in 1963.

•

USSR—The Russians say they'll have their first fully automated and remote-controlled oil field in Tataria. Tass, the government news agency, says outfitting has started in the Kasan field on the Volga River. Production, storage, and transport operations spread over dozens of square kilometers will be controlled from a single switch panel in Kasan, Tass claims.

•

Wildcats in the News

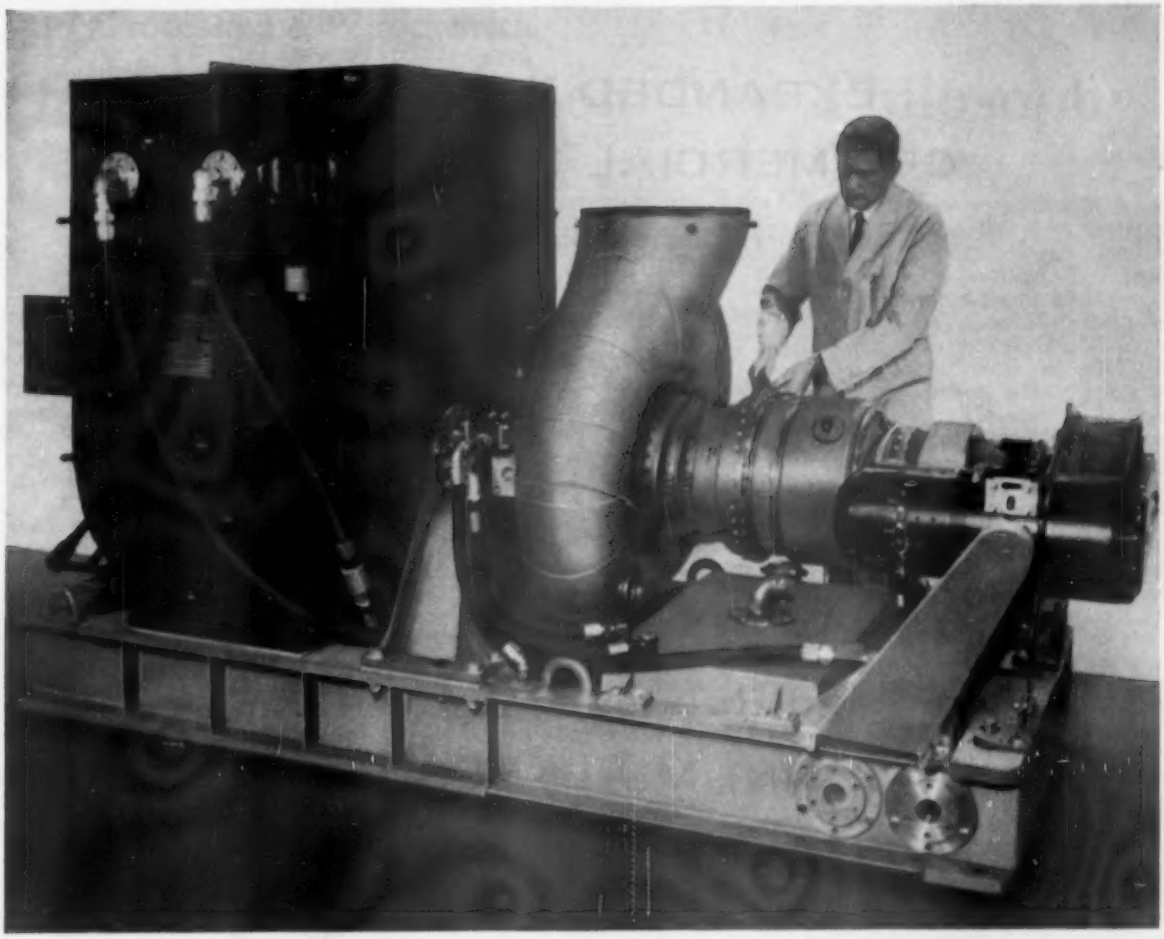
LIBYA—Gulf Oil will drill its next western Libya test with air. Location of the F-1-66 is 170 mi. south of Tripoli, along the northern portion of block 66, near Oasis Oil's block 60. Gulf's current E-1-66, is being drilled below 5,100 ft.

GABON—Socony's French partner found oil in the first stepout to its Rembo Kotto discovery. The new test, about 1,500 ft. south of the discovery, produced 9 bbl. of high-gravity crude on one-hour drillstem test through ¼-in. choke. The pay section, 1,949-73 ft., was found at about the same depth as in the Rembo Kotto discovery, which is now being drilled below 7,457 ft.

NIGERIA—Socony's first test in Nigeria has been abandoned. The No. 1 Afowo, 30 mi. west of Lagos, was bottomed at 7,051 ft. Socony says this test, on its 2½-million-acre block in southwestern Nigeria, was drilled for stratigraphic information.

SENEGAL—After three dry holes last year, the French-British Soc. des Petroles du Senegak is drilling its fourth test in north central Senegal. The No. 4 Dmdiamniade, 1½ mi. north of No. 2 Pout, is being drilled below 1,673 ft. The Pout test was abandoned at 6,903 ft., and No. 1 Diourbel was abandoned at 13,622 ft. Total depth of the No. 1 Kolobane is not available.

IRAN—The Consortium reports its second coastal wildcat, No. 2 Mund, has reached 5,550 ft., though encountering "considerable" technical difficulties. Meanwhile, testing continues of oil shows found in the Asmari limestone in No. 1 Binak, its first coastal wildcat.



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On-Stream Inspection: New Philosophy

Stanvac develops elaborate program, to replace costly internal inspections with continuous external checkup of equipment, using appropriate detection methods.

A "major breakthrough" in refinery maintenance, which is said to promise millions of dollars of annual savings, is being developed by Standard-Vacuum Oil Co. Stanvac calls its ambitious program, the "on-stream inspection (OSI) philosophy."

This program is more than a new method for taking care of the various units in a refinery. It is a new approach to the problem of inspection and maintenance. Its purpose is to reduce as much as possible the off-stream time of any unit for turnarounds and internal inspections, and to extend the length of runs of all the equipment, under constant scrutiny.

Many major oil companies have been developing various aspects of such a philosophy over the years. However, Stanvac—joint subsidiary of Standard Oil Co. (N.J.) and Socony Mobil Oil Co.—is among the first to devote a concentrated effort to it.

A shutdown of a unit is one of the most expensive occurrences in a refinery. This is due not only to the loss of products during the off-stream period, but also to the huge amount of labor required to bring a large processing unit back on the line.

Every refinery has estimates of its own—purely empirical—representing the cost of a shutdown; these figures are surprisingly high.

The OSI philosophy prescribes that no equipment will be shut down for inspection unless all means of obtaining the necessary information while on stream have been exhausted. These means are the new in-service inspection techniques.

Within the past few years, new methods in nondestructive testing have become of major interest to refiners. Several companies have done development work pertaining to the new program, and have been successful in adapting these methods to the continuous, on-stream inspection of virtually every piece of equipment in a typical refinery.

Five basic techniques are involved in the implementation of on-stream inspection. But these are by no means rigid or final. Great flexibility must be available for satisfactory application to each individual case.

These methods are not new, the engineers in charge of the project explained to PETROLEUM WEEK. What is new is their coordinated adaptation to the great variety of inspection requirements in the refineries. That is what constitutes the "package" that Stanvac is at present endeavoring to introduce in its refineries in the Far East.

These five basic techniques are:

(1) Nucleonics. Here low intensity radiations from radioisotopes—in the millicurie range—are used to monitor such features as wall thicknesses and deposit accumulations, in pipes, reactors, or other vessels; flow rates; leaks; and interface boundaries between products (PW—Oct.9'59,p75).

(2) Gamma-radiography, including X-rays. The difference between this technique and nucleonics is merely one of the intensity of the current. The higher level of X-rays and gamma-rays makes it possible to obtain, for study and recording, photographs of the internal condition of a system. This technique can be applied equally well to solids or to fluids.

(3) Ultrasonics. The principal used in this method is that of high-frequency sound wave reflections. It is used to check flaws in solid objects, to test bonded linings and welds, and to follow the degree of corrosion.

(4) Thermometrics. This technique covers the use of paints and crayons that change color at specific, known temperature levels. They can be used over a range from 100F to 2,500F, and are handy for detecting hot spots.

(5) Electronics. By this term, Stanvac engineers designate all the electronic measuring methods that are not covered in any of the other categories. Many methods for the measuring of moisture, temperatures, levels, speeds, vibrations, corrosion rates, inhibitor injection control, pollution detection, explosivity, and so on, have been examined, and have been adapted to the complex needs of the program wherever practicable.

Most of the instruments and equipment required for all these techniques are available on the market. Others were developed from scratch. But the essential part of the program is the correct adaptation of this "hardware" to the specific requirements of each case.

In many instances it has been necessary to design the instrumentation into a unit, or to redesign a unit to use the instrumentation. Each problem is a little different, and no one technique can be used all over; it must be tailored to each case.

"The effectiveness of OSI," a Stanvac spokesman adds, "cannot be defined by the adequacy of its basic theory, the perfection of its techniques, or the superiority of its instrumentation; its success will be derived from judicious coordination and from programming."

The advantages of such a program obviously go beyond those afforded by a reduction of turnarounds: A substantial reduction in spare parts inventory can also be affected.

For safety reasons, refiners order and keep on hand for turnarounds many parts which they believe might be found broken or worn out upon internal inspection. With the adoption of the continuous, on-stream inspection, a clear picture of much of the internal condition of the equipment is constantly available, and replacement parts—barring accidental occurrences—can be ordered only if and when needed.

This is of particular advantage in Stanvac's overseas operations.

The task of having the OSI philosophy accepted in all of the company's refineries, on a world-wide basis, is a particularly delicate undertaking, Stanvac points out.

"Our methods have been thoroughly tested," the spokesman says, "for the past two years. One refinery, which adopted an OSI program two years ago, has saved hundreds of thousands of dollars each year in maintenance and inspection costs. Notable gains in terms of safety and efficiency have also been obtained.

"It is likely to be quite a job, however, for Stanvac or any other company to convince the personnel of its refineries of the safety and the merits of a program which departs so radically from the traditional, tested methods. The 'old guard' must not only be sold on the basic idea of eliminating periodic internal inspections, but also on the use of methods which, at least in their practical applications, are completely new to most. Demonstrations will have to be staged in each and every case."

More Greaseless Auto Bearings

Bearings made of plastic materials that need no lubrication are being used in increasing quantities in the automotive industry. But refiners may find some consolation in the fact that these plastics are of petrochemical origin.

R. E. Harmon, of the Plastics Division of Garlock Packing Co., this week reviewed the progress made by unlubricated bearings in automobile construction, at the annual meeting of the Society of Automotive Engineers, in Detroit.

He distinguished between bearings that initially contain a supply of solid graphite, or other solid or liquid lubricants—the greased-for-life bearings—and the real greaseless bearings, which require no lubricant at all.

Most frequently used in greaseless bearing construction is fluorinated polyethylene, known as Teflon, made by E. I. du Pont de Nemours Co. Nylon is also used. Two other materials, FEP fluorocarbon resin and Delrin acetal resin—both tough and wear-resistant plastics—are in the development-production stage at du Pont.

"However," says Harmon, "no one plastic or composite is applicable to all dry bearing installations, just as no one metal or composite can be applied to all conventionally lubricated bearings."

Greaseless bearings are seldom made of natural, unmodified plastics. They are usually reinforced with fillers of other materials.

Bearings of natural plastics would be unsatisfactory except in very few applications, because:

- They have a high thermal expansion, which would require large clearances between the shaft and the bearing shells to avoid seizure;
- They have poor heat conductivity, which would limit their application to slow-moving parts;
- They have relatively low compressive strength, which means a low load-carrying capacity.

Fluorocarbon resins and nylon were first mixed with glass fibers as a reinforcing filler. While glass is still used, new fillers have come into the picture, such as asbestos, molybdenum disulfide, carbon, bronze, iron oxide, or combinations of these materials.

Fillers greatly improve the physical properties important in a bearing, says Harmon.

Combination bearings are used in various parts of power-steering mechanisms. They are also used in railroad car construction.

They have a very constant wear curve.

The latest plastic bearings are made in combination with wire screen or perforated metal. They also come in the form of woven fabrics, or combined in porous bronze, and with a metal backing.

In woven fabric bearings, the orientation of the fibers tends to overcome the low load-carrying capacity of the resin, but these bearings are limited to low-speed mechanisms.

Combined with fabrics such as glass or cotton, sometimes with a phenolic adhesive support, the load-carrying capacity of woven fabric bearings is much higher. They have been used successfully in the aircraft industry, and have also been applied to suspension and steering ball-joints of vehicles. One truck manufacturer, says Harmon, has adopted this type of bearing for his 1960 models. "This type of bearing," he says, "appears to offer a definite contribution, with emphasis on chassis lubrication."

One of the better unlubricated bearings is a composite consisting of a steel backing strip, a middle layer of porous bronze filled with a mixture of fluorocarbon resin and lead powder, and an overlay of 0.001 in. of Teflon-lead mixture.

Each of these layers has its specific purpose: to increase structural strength, carry away heat, and improve the low-friction characteristics.

There are many applications of this composite in European car construction: in propulsion shaft bushings, brake and clutch pedal assemblies, throttle linkages, gear change mechanisms, gear cross-box shafts, and many other parts.

In turbine combustors . . .

Luminous Flames Add Little Heat

Radiant heat, generated by luminous oil flames in the combustors of turbine aircraft, now appears to be much less significant than was expected, (PW—Aug.7'59,p11), according to an extensive study sponsored by the U.S. Navy and conducted by the Research Division of Phillips Petroleum Co. and by the Naval Air Material Center, Philadelphia.

R. M. Schirmer and L. A. McReynolds, of Phillips, and J. A. Daley, of the Aeronautical Engine Laboratory, described the tests at the annual meeting of the Society of Automotive Engineers in Detroit this week.

Twelve specially prepared fuels were used, varying from an aromatic-free paraffinic oil to an entirely aromatic product. Three different flame pressures were used, ranging from atmospheric to 15 times that pressure.

The tests demonstrated that carbon particles in hydrocarbon-air flames are not usually of sufficient size to radiate appreciable energy.

It is the particles of carbon, in suspension in the flame, that give it its high luminosity. But at near-atmospheric pressure, and in the significant infrared region of the spectrum, the action of these particles is negligible.

It is only with high-pressure flames that carbon particles can grow sufficiently in size to radiate a significant amount of heat. But in this case, the severe radiant heat endangers the durability of the combustor.

At a pressure of 10 atmospheres, manifestations of excessively high temperatures appear: buckling of the combustor, distortion of the air inlet openings, and loss of metal.

The tests also demonstrated that the products of combustion had a shielding effect between the radiant particles and the combustor. As a result, no prediction can be made as to the behavior of a metal part exposed to radiant heat unless its exact position with respect to the flame is known.

The hydrocarbon structure of the oil has an important effect on the flame radiation.

An aromatic fuel with a high luminosity, for example, causes the combustor to deteriorate as much as four times as fast as a paraffinic oil. As an index of combustor durability, the rate of combustor metal loss, expressed in pounds per hour per sq. ft. of metal surface exposed, was used.

The tests confirm that, until the physical and chemical processes involved in high-pressure combustion can be better controlled, it is advisable to hold back high flame radiation intensity.

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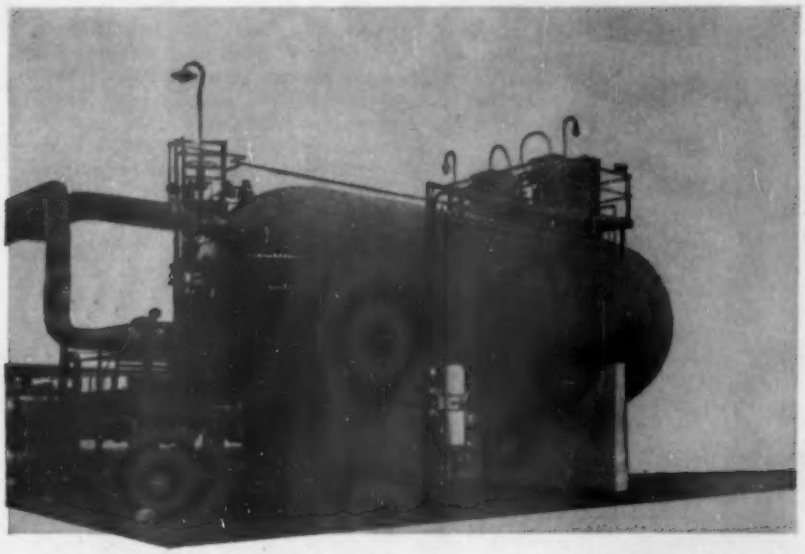

facts to consider

WHEN YOU SPECIFY DESALTING EQUIPMENT

1 EFFICIENCY IS MEASURED IN TERMS OF REMAINING IMPURITIES. The ultimate measure of any desalting process is its thoroughness in removing salts and impurities—*not how much salt is removed, but how much salt is left in.*

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2 SALT "SETTLING" IS NOT TRUE DESALTING. Salt settling is one way to remove salts, but desalting is something else. "Settling", using long "residence time" in large volumetric capacity settlers, was one of the first methods ever used to remove salts.

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3 TIME, DISTANCE AND SETTLING SPACE ARE NOT IMPORTANT FACTORS IN PETRECO ALL-ELECTRIC DESALTING. These natural developments are vital only to desalting methods wherein settling is necessary to the functioning of the process.

In Petreco all-electric desalting, engineered emulsification, distribution and demulsification bring about rapid, controlled action.

Because of this, Petreco desalters are usually smaller than vessels used in less advanced methods. This means savings in the cost of the vessel required, the amount of piping and the ground area needed—and yet provides a maximum yield in salt removals.

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As multipurpose additives . . .

Surfactants May Win Race

Recent tests indicate that surface-active agents may have certain advantages over freezing-point depressants as additives in gasoline to prevent cold-stalling (PW—Sep.4'59, p39).

These tests are being conducted at Southwest Research Institute, San Antonio, Tex., and are sponsored by Armour Industrial Chemical Co. of Chicago, which manufactures additives under license from several oil companies.

These tests are being conducted at SwRI's laboratories under carefully controlled conditions of temperature and humidity, engine type, load, and speed. Winter-grade gasoline is used.

Stalling is particularly frequent at temperatures around 35F and when humidity is high (above 75%). It is due to the formation of ice on the throttle plate of the carburetor, and adjacent surfaces, when the moisture in the combustion air is cooled by the rapid evaporation of the fuel.

Freezing-point depressors act by avoiding the formation of ice, whereas the action of surfactants results from a change in the surface tension of the liquid on the metal surfaces.

Freezing depressors commonly used are isopropyl alcohol (isopropanol) and hexylene glycol. Surfactants that have proven effective are di-amines and tertiary amines, with fatty alkyl groups.

At present the market is about equally divided between freezing-point depressants and surfactants.

Economic considerations, which used to favor the surfactants, are no longer valid, as the cost of treating gasoline with either type of additive is about equal.

A concentration of 1%, or 10,000 parts per million, is the minimum needed to obtain adequate antistalling with isopropanol, which increases substantially the cost of the gasoline treated. But one-tenth of that concentration is satisfactory with hyxylene glycol, according to Shell Chemical Co., one of the companies that manufacture it.

This brings the cost on a par with that resulting from the use of surfactants.

For example, Armour's Duomeens, Ethomeens, and RD-3063 O, a relatively new fatty nitrogen derivative, are said to be effective in concentrations of from 50 to 150 parts per million.

But the surfactants are said to offer some additional advantages, such as corrosion inhibition, anti-rust properties, and, in some cases, detergency.

Armour is working toward the development of a multipurpose additive that will, in very small concentrations, work as an antistall and antifouling additive, and as a corrosion inhibitor, and at the same time be compatible with other components and additives in gasoline, such as dyes, antiknock additives, scavengers, and combustion modifiers.

SwRI is doing a considerable amount of research on the behavior of motor fuels during combustion, with particular emphasis given to the formation of deposits, and to combustion noises.

What's New / IN PROCESSING

Continental Oil Co. will build a $1-million cyclohexane plant at its Ponca City (Okla.) refinery.

When completed in September, the plant will produce more than 20-million gal. a year of the petrochemical, used primarily as a raw material for the manufacture of nylon.

Procon, Inc., Chicago, is handling construction.

At the same time, Gulf Oil Co. announced completion of a cyclohexane plant at its Port Arthur (Tex.) refinery. Production is expected to begin Feb. 1.

•

Standard Oil Co. of California is sinking another $33-million into its Hawaiian refinery, now under construction near Honolulu.

The amount, nearly double the company's original investment, will go for additional construction, including a 13,000 b/d fluid catalytic cracker, an alkylation plant, hydrogenation and isomerization units, a carbon monoxide boiler, and expanded storage facilities.

The added units are expected to go on stream by mid-1962.

•

New lubricants and new alloys for servo-mechanism cables exposed to the high temperatures of space travel, are being studied at Washington State University.

The range of temperatures considered is from 1,000F to 1,500F, according to Dr. E. M. Klemgard who is supervising the research.

The lubricants are halides and oxide types with suspended graphite.

A special friction and wear tester has been developed for these studies by the university.

•

Shell Chemical Australia Pty., Ltd., will start producing ethylene in 1962.

That's the completion date for a proposed plant at Shell's Clyde refinery, near Sydney.

The ethylene will be piped 12½ mi. to Imperial Chemical Industries' plant, where it will be turned into polyethylene.

Shell also plans to produce other ethylene-based chemicals, formerly imported.

•

Borden Chemical Co. has announced plans to construct a 40-million-lb.-per-year polyvinyl chloride plant, at Illiopolis, Ill.

The plant will produce a full line of polyvinyl chloride and copolymer products, and will include facilities for raw material storage, polymerization reaction, blending, drying, and compounding.

Cost: $4-million.

Computers Control Chemical Plants

The country's first completely computer-controlled chemical-plant units are now in operation. Both of them use Thompson-Ramo-Wooldridge RW-300 digital computers to do the job.

One is Monsanto Chemical Co.'s ammonia plant at Luling, La. The other is B. F. Goodrich Chemical Co.'s vinyl chloride monomer unit at its Calvert City (Ky.) plant.

Loading of this portable drill rig was started at 6:30 A.M., and Macks are ready to haul it to new location in Cadiz Field, Live Oak County, Texas—32 rugged cross-country miles away.

ON SCHEDULE—REGARDLESS

"Here's why we operate with the best equipment we can buy," says H. L. (Brownie) Choate, veteran oil field trucker of Alice, Texas.

"One thing you can't afford in this fast-moving business is on-the-job truck breakdowns or bogdowns . . . even though you have to make your drilling equipment move on schedule, never knowing exactly what you're going to run into, or what your trucks will be called on to do.

"On-the-job breakdowns have become a thing of the past since we made Macks the backbone of our fleet. And as for bogging down, experience has convinced us that Mack's four-wheel drive Balanced Bogie with Power Divider will pull through anything that we, or anyone else, will run into in this business."

Brownie Choate and his experienced truck pusher "Boots" Niehaus know their job . . . and their Macks. They expect rugged working conditions, and they're ready for them with trucks that are built to take on the roughest, toughest jobs in the oil fields.

Your Mack branch or distributor will show you why Mack trucks can save you plenty in terms of downtime, delays and headaches. Mack Trucks, Inc., Plainfield, New Jersey. In Canada: Mack Trucks of Canada, Ltd., Toronto, Ontario.

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At new drilling site, Macks go to work setting up rig platform. Terrain proved unexpectedly bad but the trucks were there on schedule. On-the-job performance comparisions switched H. L. Choate to Macks.

New rig platform nearing completion as Macks spot heavy platform sections. Jobs like these call for fast, sure teamwork between trucks and crews. This job was cleaned up in 6½ hours . . . thanks to capable equipment.

MOTORBOATS that require high-octane gasoline, and outboard motors that burn diesel fuel (right) are two of the . . .

Changes Coming in Small-Craft Market

Lighter, more powerful engines, requiring higher-octane fuels, and broader application of diesel engines are the big news in pleasure boating for oil marketers this year.

A survey of exhibits in the Golden Anniversary Motor Boat Show in New York this week reveals that several manufacturers are stepping up the horsepower of their craft this year.

Crusader Marine, which is showing the show's most powerful boat, with 325 hp., recommends 100-octane fuel for its entire line of V-8 inboards.

Mercury (Kickhaefer Corp.) is the horsepower leader in outboards, developing 80 hp. in its new Merc 800.

The trend toward producing marine diesel engines for use in smaller recreational and work boats will continue throughout 1960, says a boat show spokesman.

At present, however, the diesel demand is small. There are only 4,000 inboard diesels, which can be fueled from pumps at some marinas. At most marinas, the nonvolatile diesel fuel is stored in small containers.

One company—American Marc, Inc.—has introduced "the world's first diesel outboard," which it will begin producing this month.

Special aluminum alloys are used in this diesel outboard, says the company, to make it extremely light in weight. (The weight factor had up until now restricted diesel engines to larger boats.)

The outboard's 20 to 1 compression ratio enables the boat to get more "energy from its fuel," says American Marc.

In five to seven years, 50% of the inboard boats in use will contain high-compression engines, requiring high-octane fuels, says George E. Maxwell, manager of the small craft division for Mobil Oil Co.

Of the 804,000 inboard engines in use today, Maxwell says, only 40,000 (less than 5%) need a premium-grade fuel.

But this number will increase every year, he notes, as the demands of American boat-owners for speed and quick starts encourage manufacturers to build more powerful boats.

Both Esso Standard Oil Co. and Gulf Oil Corp. also foresee a continued rise in the octane requirements of small craft.

Gulf introduced a new high-octane supermarine gasoline of low-lead content at the 1959 boat show in New York to meet this shifting demand.

For the outboard market, several oil companies are searching for a pump that will mix oil and gasoline right in the hose.

At least two pump makers (Bowser, Inc., and Wayne Pump Co.) are working on such a pump—but neither has passed the development stage.

One problem in mixing oil and gasoline for outboards, says a Wayne spokesman, is that the differing viscosities of oil and gasoline causes them to foam when they are mixed too quickly.

But the outboard market is worth attempting to satisfy. At present, there are 5,845,000 outboards, according to Maxwell.

Over-all, the small-craft market will consume 490-million gal. of gasoline this year (compared to 404-million gal. in 1959), Maxwell predicts, plus 24.5-million gal. of motor oil.

California Standard explains . . .

Why 'Teeth' in Dealer Leases

Standard Oil Co. of California, Western Operations, Inc., has added "teeth" to its stand against dealer merchandising that detracts from the sale of petroleum products and TBA items.

In its new lease for Chevron dealers —which will go completely into effect by June—Standard has introduced an "over basic rent" factor.

This rental is charged against the gross profit of all items that fall outside of a prescribed list of conventional service station products and services.

This list includes gasoline; oil; tires; batteries; lubrication, tire and battery services; and the sales and service of accessory items that California supplies to its dealers.

The over-basic-rent factor amounts to about 10% of the gross profit of items outside this list.

The "teeth" were inserted into new dealer contracts because of the recent West Coast consent decree,

which requires suppliers to give their dealers a firm contract for three years (PW—Jun.26'59,p14).

Prior to this decree, Standard had charged its dealers a flat rental based on estimated gallonage for the year and estimated sales in other areas. A spokesman for the company explains that to continue offering such a rental system on a three-year basis would be unrealistic, since many changes in an outlet's operation can occur during this time.

California Standard's attitude toward dealer diversification remains unchanged—regardless of the apparently stronger stand against non-prescribed sales and services.

The breadth of items a Chevron dealer is encouraged to sell is the same. And as for items outside this select list, a Standard spokesman told PETROLEUM WEEK, "We have no objection to a dealer's engaging in these sales, if they are not carried to the point of conflict with normal service station operation.

"The only reason for the construction of a service station is to promote the sales of petroleum products and TBA. We believe that the supplemental rent of 10% of gross profits is a reasonable charge for the use of leased premises for additional purposes."

The new leases have stirred up criticism among some Chevron dealers, who view them as a deterrent to many sales that have become an important part of their operations.

The sales and service that are "incidental to a service station," says John Touhey, executive secretary of the California Federation of Service Stations, include several items that are not supplied by California Standard. But when a Chevron dealer signs the new lease, notes Touhey, he will be charged extra rental based on the gross profits from these items.

Touhey also maintains that Standard's new leases are inconsistent with the company's encouragement of dealer diversification: "During the past two years," says Touhey, "the majority of Chevron service station dealers have been encouraged to purchase tune-up and brake equipment, because they were not going to get any more profit on gasoline."

Some Chevron dealers also object to having to open their books to their supplier.

The new lease requires that a dealer "keep accurate books and records of the quantity and dollar amount of all of his sales of merchandise and services, and of his merchandise cost prices."

In addition, the dealer must agree to "make said books and records available to lessor [California Standard] for inspection during regular business hours."

But a Standard spokesman points out that there is nothing unusual in this stipulation, since the rental charge is now based on actual sales of products—rather than estimated volume.

One clause that has also aroused dealer criticism has actually been liberalized, California points out.

Under previous contracts, Chevron dealers received a rebate for maintaining a clean, well equipped pair of restrooms. During price wars, however, this rebate was cancelled.

Now the rebate is to be deducted from the basic rental charge, and it will be paid regardless of whether a price disturbance has occurred.

Touhey has charged that this clause gives California additional powers to "police" dealer stations. Added to the clause that prescribes clean and orderly lawns and shrubs, the restroom requirement seems to cut into the dealer's control over his own station, according to Touhey.

But a spokesman for Standard says the restroom allowance should be construed as a "reward" rather than as a threat, and that it provides tangible incentive to the dealer to a degree that ordinary "education" cannot.

The point to remember, says California, is the intent of the lease and the manner in which it is applied.

Many "doubtful" clauses, such as the ten-day cancellation notice, are not new and have been inserted only to permit a lawyer to act if necessary.

"A big part of the so-called outburst," says California—not entirely facetiously—"may be that the new lease is substantially shorter than its predecessors, and that for the first time dealers are reading it."

What's New / IN MARKETING

Rep. James Roosevelt (D., Calif.) will not stop with TBA in his investigation of oil marketing practices this year.

Roosevelt told PETROLEUM WEEK last week that his small business subcommittee hearings may cover such topics as commercial accounts, price-setting by company-operated stations, and dealer turnover, among other things.

As for TBA, Roosevelt said he plans to introduce divorcement legislation "in a few days" (PW—Dec.18'59, p62).

•

Service station dealers sold less motor oil per 100 gal. of gasoline in 1959 than ever before, according to National Petroleum News, a McGraw-Hill Publication.

The national average last year was 0.96 gal. of motor oil per 100 gal. of gasoline. This compares to 1.06 in 1958 and 1.10 in 1957.

•

Gasoline prices on the New York Thruway have been cut back to the level of competitive prices at off-Thruway stations, the Thruway Authority announced last week.

An average of the prices posted at off-Thruway stations establishes the maximum that Thruway outlets can charge. New contracts between the Authority and the nine oil companies involved reflect the lower price level.

As a result of the new ruling, some New York Thruway stations dropped as much as 4.6¢ per gal. in price.

•

Shell Oil Co. has developed a filmstrip to test a motorist's speedy preception of highway driving hazards.

The filmstrip (the second of a series) covers super highway hazards, and is designed for classroom audiences. After they are shown a potentially dangerous situation, the viewers are asked to spot the hazard and tell how they would avoid it.

This filmstrip and an accompanying manual are offered free by Shell to high schools, corrective clinics, owners of industrial fleets, and safety organizations.

•

Total sales of domestic oil burners in 1959 scored a 12% gain over 1958, according to Robert Gray, president of the National Fueloil Council.

The gun-type, high-pressure burner design continues to represent 85% of annual oil burner sales. The installed price of this design dropped 4% in 1959 to an average of $356 per job.

DEPT / Personals

J. A. HORNER becomes president of Shell Pipe Line Corp., Houston. Horner, who was most recently secretary of Shell Oil Co., in New York, succeeds **Joe T. Dickerson,** who has retired. Horner joined Shell in 1936, and became administrative assistant in the office of the Shell Oil president in 1945. In 1949 he was appointed assistant secretary of the company, and in 1953, secretary.

M. I. Landa

J. A. Horner

MAYNARD I. LANDA has been elected vice-president of Cities Service Petroleum, Inc., New York. He has been petroleum economics coordinator for the Cities Service system since 1953. He joined the organization as a junior engineer in 1949.

ALEXANDER F. IMLAY has been elected secretary and treasurer of Esso Standard Division of Humble Oil & Refining Co., New York. He succeeds **Lester R. Moore,** who has been named treasurer of Humble Oil & Refining Co. (Del.). Imlay has been an assistant treasurer for Esso since 1956, and served earlier as assistant to the treasurer of Jersey Standard.

NORMAN A. OLANSEN has been appointed assistant treasurer in the petroleum department of the Chase Manhattan Bank. He has been engineering assistant in that department since he joined the bank in 1955.

WILLIAM PRIESTLEY, JR., becomes director, and **Hollis L. Leland** assistant director, of the newly formed analytical research division of Esso Research & Engineering Co., Linden, N. J. The new division will consolidate the analytical personnel presently affiliated with the company's research divisions. Priestley was formerly acting assistant director in the process research division, and Leland was head of the analytical section of the products research division.

FRED A. YOUNGS has been named assistant controller of the Esso Standard division of Humble Oil & Refining Co., New York. Youngs, with Esso since 1934, was most recently coordinator of manufacturing accounting in the controller's department in New York. In his new position, he succeeds **Lamar Jones,** who recently became assistant controller of Humble.

F. A. Youngs

J. S. Sprowls

JOHN S. SPROWLS, vice-president and assistant to the president of Vickers Petroleum Co., Wichita, Kan., has been elected a director. Sprowls was assistant treasurer in charge of loans and related investments of Gulf Oil Corp. before joining Vickers last September. Sprowls is located at Vickers offices in Denver.

LOUIS OLEARI becomes assistant manager of the Latin America-Asia division of California Chemical International, Inc., subsidiary of Standard Oil Co. of California. The division includes Japan, Hong Kong, Australia, Thailand, India, and other Far East markets, as well as Mexico, Central and South America, and the Caribbean countries. Before his new appointment, Oleari was district sales manager in Houston for the southern section of Oronite Chemical Co., also a Standard subsidiary. Oleari's new office will be at the company's San Francisco headquarters.

JOHN H. McWILLIAMS moves up from assistant manager to manager of Sun Oil Co.'s land department in Philadelphia. At the same time, he assumes the posts of vice-president and director of Sun's nine foreign production subsidiaries. In both new positions, McWilliams succeeds **Winfield Givens,** who is retiring.

C. D. Owens, Jr.

J. H. McWilliams

C. D. OWENS, JR., moves to New York as assistant to **Millard E. Stone,** vice-president and director of industrial relations for the Sinclair companies. He has been manager of industrial relations for Sinclair Oil & Gas Co., in Tulsa.

A. L. Lanckton

R. Warner Jr.

ARTHUR L. LANCKTON has been named executive vice-president of Mobil International Oil Co., overseas operating division of Socony Mobil Oil Co., and **RAWLEIGH WARNER, JR.,** has been named acting executive vice-president for Africa, Europe, and Latin America. Lanckton will be in charge of the company's staff services, which have been grouped together to serve line managers more efficiently. Lanckton, who has been with Socony's international operations since 1938, was most recently vice-president in charge of northern and southeastern Europe, and Warner was formerly regional vice-president, Middle East. Other new Mobil International vice-presidents are: **John C. Dean,** supply and distribution; **Burton C. Fowler,** marketing; **Charles P. Baker,** manufacturing; **Curtis M. Klaerner,** regional vice-president, northern and southeastern Europe; and **William E. Lindenmuth,** acting regional vice-president, Middle East. At the same time, **Lewis A. Lapham** and **Albert L. Williams** were elected directors of the parent Socony Mobil Oil Co. Lapham is chairman of the executive committee of Bankers Trust Co., New York. Williams is executive vice-president of International Business Machines Corp., New York, and a member of its executive and finance committees.

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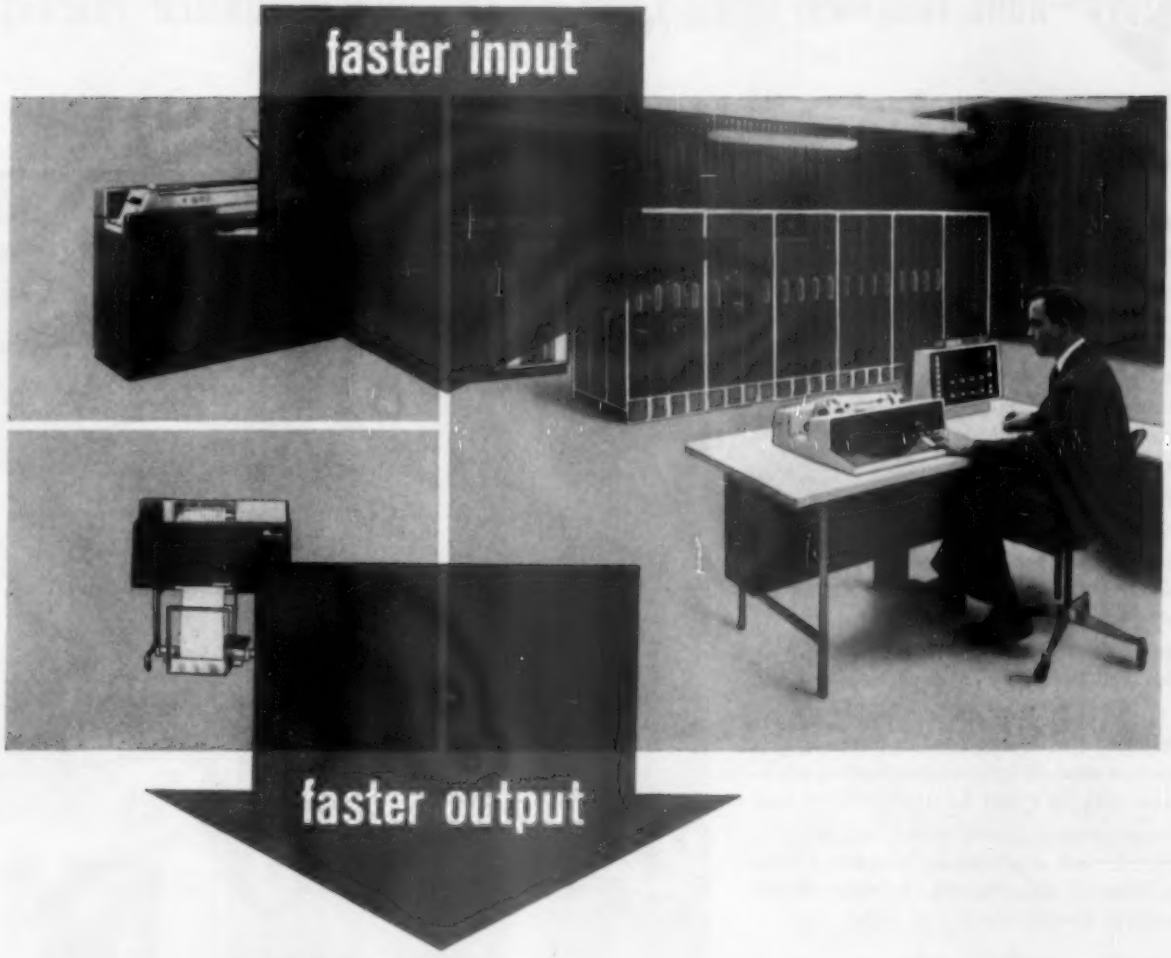

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The tape-oriented 7070 employs the 1401 System to boost card-to-tape conversion from 500 to 800 cards a minute. The 1401 also features an exclusive horizontal chain printer that turns out crisp, perfectly aligned copy at 600 lines a minute. This unique printer moves paper at magnetic tape speeds—up to three and a half times faster than conventional printers!

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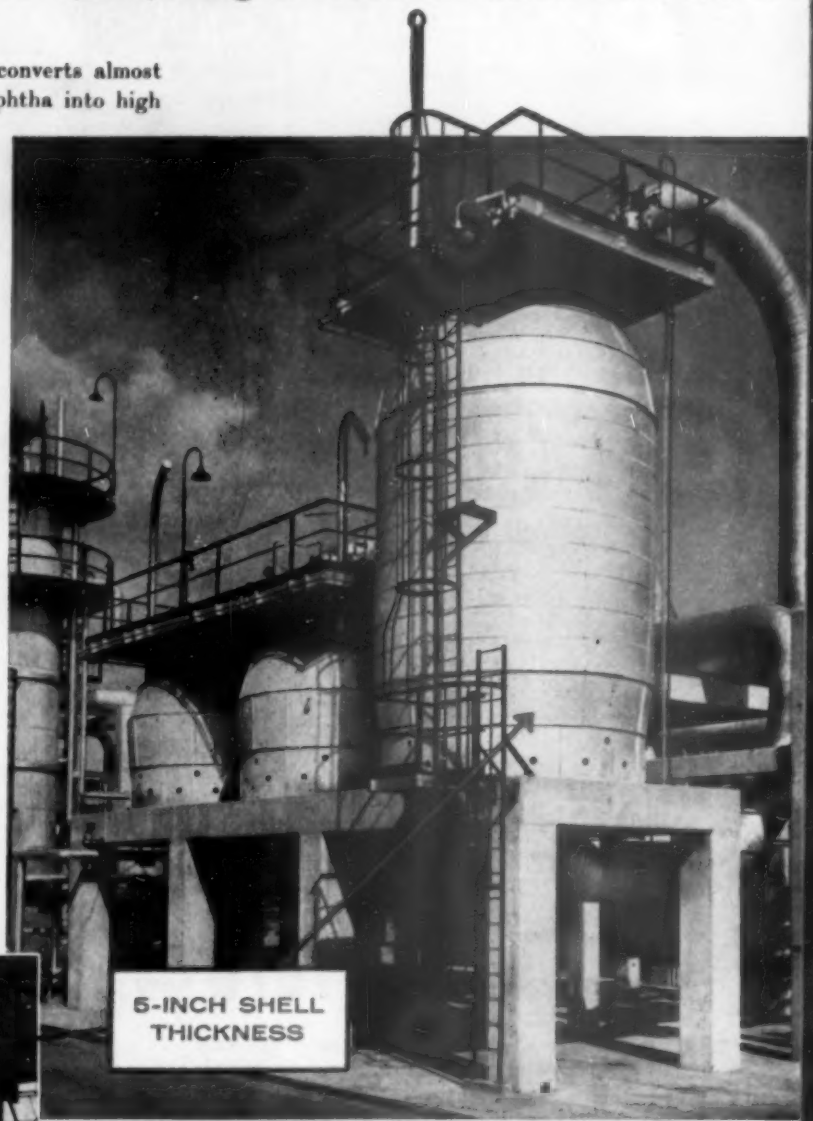
....CB&I-built reactors serve 1,000,000-gal. HOUDRIFORMER Process....

This high severity catalytic reformer unit converts almost a million gallons per day of low octane naphtha into high octane blending stocks.

The three CB&I-built reactors incorporated in the process handle upwards of 127,000 pounds of platinum catalyst per charge. They were fabricated of plates up to 5 inches thick . . . to meet the rigid specifications dictated by extremely high and controlled temperature and pressure conditions. In addition, the critical vessels were shop X-rayed and stress relieved to insure optimum performance and long service life.

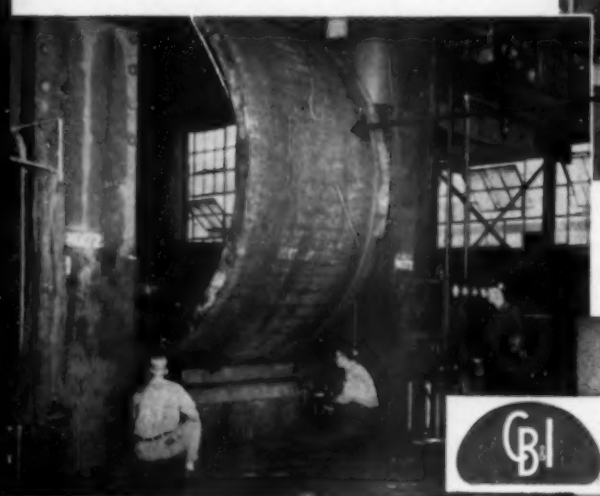
Fabricating 5-inch plate to customer or code specifications is not an unusual job for CB&I. Increased complexity in refining operations demands the exacting attention to detail made possible by CB&I's advanced metallurgical facilities.

Creative fabrication, combined with experienced and *coordinated* engineering and erection services is the reason leading processors rely on CB&I for the tanks, towers and processing vessels which help to keep them abreast of petroleum progress. Write our nearest office for the bulletin: *CB&I Creative Craftsmanship in Steel.*



CB&I-built reactors contain catalyst for *Houdriformer*—high severity reforming process. Hydrogen by-product, generated in process, is recovered for use in another process that removes nitrogen and sulfur compounds from gasoline and propane.

Reactors were furnished through the Bechtel Corporation.



Five-inch thick plate for walls of large reactor (shown above) was fabricated at CB&I Birmingham plant.

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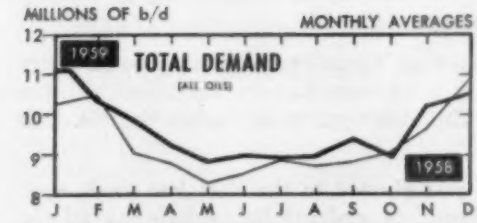
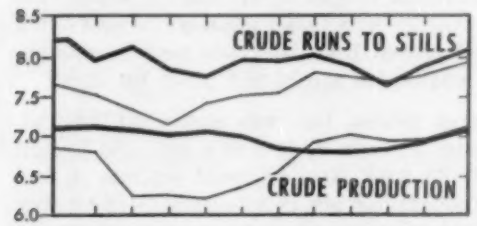
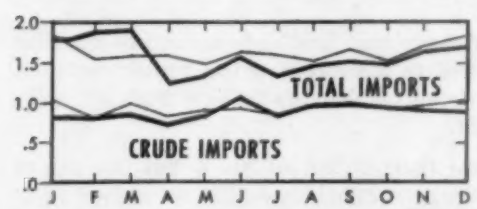
PETROLEUM WEEK'S

Fingertip Figures







Figures for period ended January 8, except as noted

TOTAL DEMAND

Latest 4-week average	10.555
Year ago	10.448

DISTILLATE DEMAND

Latest 4-week average	3.044
Year ago	3.702

RUNS TO STILLS

Latest week	8.396
Previous week	8.369
Year ago	8.245

CRUDE PRODUCTION

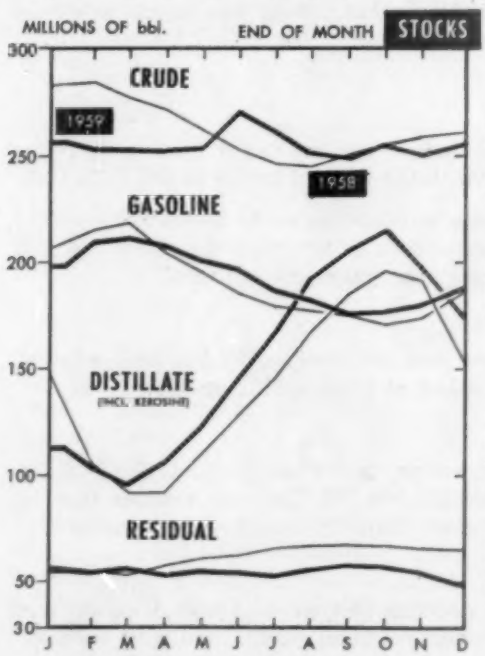
Latest week	7.112
Previous week	7.068
Year ago	7.052

TOTAL IMPORTS

Latest week	1.709
Previous week	1.183
Year ago	1.857

CRUDE IMPORTS

Latest week	.758
Previous week	1.107
Year ago	.808



CRUDE STOCKS

Week-ended 1-2	252.9
Previous week	255.5
Year ago	262.9

GASOLINE

Latest week	196.9
Previous week	189.0
Year ago	186.9

DISTILLATES

Latest week	169.7
Previous week	175.6
Year ago	152.6

RESIDUAL

Latest week	49.6
Previous week	49.9
Year ago	60.5

The industry's stock position at the year's end was the best it has been since mid-1959.

Total stocks are down to a trim 802-million bbl., the lowest point since June 12, 1959, when the week's inventories closed out at 798-million bbl. Stocks now are running pretty close to the industry's estimated "desired" levels.

Despite unusually mild weather, distillate stocks dropped another 2.9-million bbl. last week to total less than 175.6-million b/d.

But the picture is not all rosy.

Stocks of gasoline last week jumped 5-million bbl. to 193.9-million bbl., a dangerous movement in the off-peak season.

And the winter and spring outlook is somewhat uncertain as refiners continue to boost runs, setting a new all-time record last week.

The runs of 8,396,000 b/d represented the second peak set in as many weeks.

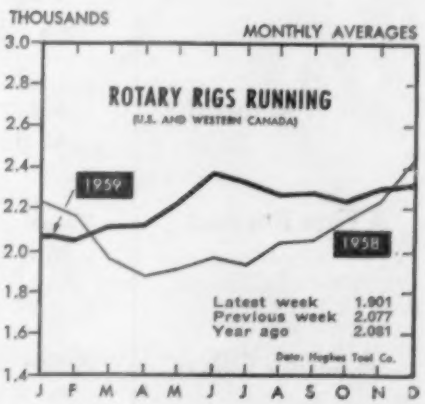
The high run rates have drawn on crude stocks, with the present indication that a majority of the crude buyers favor a hike in the February allowable in Texas.

A continuation of the present ten-day schedule in the 29-day month of February would mean a 101,000 b/d hike in the allowable.

A nine-day schedule next month would mean a 66,000 b/d cut in the allowable.

And when production and runs are at relatively high levels, the industry usually is reluctant to admit that sharp corrections are necessary when demand drops.

February's total demand is normally about 500,000 b/d under January's, and by March demand can be expected to be more than 1-million b/d below January.



The Market Trend

Needed: Cold Weather Now in the East

The trouble with the cold weather is that it showed up mostly in natural gas and kerosine territory. The Rocky Mountains, the Mid-Continent, and the Southeast have had the blizzards.

But the big fuel-oil-consuming East Coast has seen a series of short cold snaps and quick thaws. After a warmer-than-normal December, the dealers in the East are jumpy. The Brooklyn rack market for No. 2 is downright nervous.

The No. 2 fuel advance that was started in the East last week may or may not make the grade. When independents lie back to let all the majors advance first, it can be a warning that all is not well. Even the majors took three days, from Jan. 5 to Jan. 8, to complete their increases. At that, a couple of them were "cheating" on their own postings.

The general advance almost stumbled at the outset. Some of the first East Coast majors to move up on No. 2 fuel simultaneously granted customers 48-hour "protection." The theory was that customers needed extra time to fill their tanks at the old prices. But the grace period probably was strictly from fear that the customers might not show up at all.

The uptrend in delivered-cargo prices, too, was somewhat labored. New York and Baltimore prices went up from 9¢ to 9.5¢ a gal., and Boston prices generally moved from 9.1¢ to 9.6¢. Nobody could confirm it, but talk was widespread that some suppliers had put in a "special" 0.25¢ allowance on tanker deliveries.

And there were just enough cheap spot boatloads around to unsettle terminal operators who were asked to pay "full" prices under contract. A West Coast No. 2 cargo was offered for delivery to New York at somewhere in the neighborhood of 8.6¢.

Gulf Coast refiners also raised their sights on No. 2, but this might be just whistling in the dark. Refiners were asking 8.625¢ as against their earlier quotes of 8.375¢. The trouble is that nobody has bought any spot No. 2 in quantity at the Gulf all season.

Wanted: Better Mousetraps: International suppliers advanced their export prices for heating oil prices in the Caribbean in sympathy with the upward moves at the U. S. Gulf.

This presents quite a paradox, for about half the world (below the equator) is having summertime right now. But, as international sellers say, "If we don't follow the Gulf, what other yardstick is there?"

1% Resid: Low-sulfur fuel oil is firmer now that the steel strike has been averted. At the Gulf, cargo-lots were asked at $2.35 a bbl., up 10¢.

A Firm Product: Kerosine still ranks as the strongest product. There is one unfilled inquiry in the Mid-Continent for about 250,000 bbl. The cold weather that hit the Southeast zooms demand down there for fuel for space heaters.

A Crude Offer: A new face appeared in South America this week. Ancap, Uruguay's oil agency, reports receiving a French crude oil offer. Could it be Saharan?

The Market Place AROUND THE WORLD

Prices compiled for PETROLEUM WEEK by Platt's OILGRAM Price Service and National Petroleum News, McGraw-Hill Publications

All prices as of January 11

Bold face type indicates changes from previous week

KEY PRICES—REFINED PRODUCTS

(¢ per gal. except dollars per bbl. where $ is shown)

Western Hemisphere

U.S. Gulf Coast, cargoes
- Gasoline, 98 oct prem....12-13
- Gasoline, 92 oct reg....10.75-11.5
- **Kerosine....9.5-10↓**
- **Heating oil, No. 2....8.625↑-9.1↑**
- **Gas oil, 48-52 d.i....8.875↑-9↑**
- Fuel oil, bunker "C"....$2.00-2.10

Caribbean, cargoes
- Avgas, Grade 100/130....14.75
- Gasoline, 93 oct research prem....11
- Gasoline, 87 oct research reg....10.125
- Gasoline, 79 oct research....9.375
- Gasoline, 70-72 oct motor method....9.25
- **Kerosine....9.75↑**
- **Heating oil, No. 2....8.625↑**
- **Gas oil, 48-52, d.i....8.875↑**
- Fuel oil, bunker "C"....$2.00

New York Harbor, barges
- **Kerosine....10.6↑-11.1↑**
- **Heating oil, No. 2....9.6↑-10.1↑**
- Fuel oil, No. 6....$2.37-2.47

Okla.-Group 3, northern shpt., bulk
- Gasoline, 91 oct reg....10-11
- Kerosine....10.5-10.75
- Heating oil, No. 2....9.5
- Fuel oil, No. 6....$1.60-1.80

Chicago, bulk
- Gasoline, 91 oct reg....11.25-11.5
- Heating oil, No. 2....9.625-11.35
- **Fuel oil, No. 6 high sulfur....7.5↑**

Los Angeles, rack
- Gasoline, 88 oct reg....11.5-12.65
- Diesel fuel, PS 200....7.75-11.25
- Light fuel, PS 300....$2.80
- Heavy fuel, PS 400....$2.15-2.35

Natural Gasoline, Grade 26-70
- FOB Group 3....4.5
- FOB Breckenridge, Tex....4

LP-Gas
- Propane, Oklahoma (Group 3)....5
- Propane, Baton Rouge....5.625-5.875

Pennsylvania Lubes
- Bright stock, 25 p.t....23
- 200 vis. neutral, 25 p.t....27

Mid-Continent Lubes, Tulsa basis
- Bright stock, solvent, 95 v.i....25-26
- Neutral, solvent, 200-210 vis....21.5-22.5

Gulf Coast Lubes
- Bright stock, solvent, 95 v.i....25
- Neutral, solvent, 200 vis....21.5

Eastern Hemisphere

Singapore (Pulau Bukom), cargoes
- Avgas, grade 100/130....15.875
- Gasoline, 79 oct research....10
- Kerosine....10.125
- Gas oil, 48 d.i. minimum....9.625

KEY PRICES—CRUDE OIL

(2¢ differential per deg. of grav. applies except as noted)

Western Hemisphere

United States (at the well)
- Mid-Continent, (Okla.-Kan.), 36.0-36.9....$2.62-2.97
- North Dakota, 36.0-36.9....2.62-2.87
- Texas:
  - Gulf Coast, low cold test, 26.0-26.9....3.50
  - Gulf Coast, Upper & Lower, 26.0-26.9....2.92-3.22
  - West Texas, sweet, 36.0-36.9....3.00
  - West Texas, N.M., inter., 36.0-36.9....2.93
  - West Texas, N.M., sour, 32.0-32.9....2.71
  - East Texas, flat....3.05-3.25
  - Mirando, 28.0-28.9....3.31
- Illinois Basin, flat....3.00
- **Pennsylvania Grade, Bradford dist., flat....4.55↑**
- **California, Signal Hill, 21.0-21.9....2.32↑↑**
- North Louisiana-Arkansas, 36.0-36.9....2.77-3.02
- Wyoming, sweet, 36.0-36.9....2.85-2.90
- Wyoming, sour, 32.0-32.9....2.63-2.71

Canada (flat prices, at the well)
- Pembina (Alta.)....$2.38
- Leduc-Woodbend (Alta.)....2.53
- Redwater (Alta.)....2.42
- Steelman A (Sask.)....2.435
- Virden (Man.)....2.31

Venezuela (Cargoes, FOB lifting port designated)
- Cumarebo, 47.0-47.9, Tucupido....$3.34
- San Joaquin, 41.0-41.9, Puerto la Cruz....3.10
- Oficina, 35.0-35.9, Puerto la Cruz....2.78-2.80
- Tia Juana, Medium, 26.0-26.9, Amuay....2.30
- Bachaquero, flat, Las Piedras....1.75-1.88
- Tarra, 38.0-38.9, San Lorenzo....2.83
- Lagunillas Heavy, flat, Las Piedras....2.10

†Differential per deg. of grav. varies.

Eastern Hemisphere

Middle East, Persian Gulf (Cargoes, FOB lifting port)
- Arabia, 34.0-34.9, Ras Tanura....$1.90
- Safaniya, 27.0-27.9, Ras Tanura....1.50
- Iran, 34.0-34.9, Bandar Mashur....1.86
- Iran, 34.0-34.9, Abadan....1.81
- Iraq, 35.0-35.9, Fao....1.80
- Kuwait, 31.0-31.9, Mina-al-Ahmadi....1.67
- Qatar, 41.0-41.9, Umm Said....2.05
- Neutral Zone, Burgham, 23.5-24.4, Mina Saud....1.51
- N. Zone, Eocene-Ratawi, 20.5-21.4, Mina Saud....1.38

Middle East, Eastern Mediterranean
- Arabian, 34.0-34.9, Sidon....$2.27
- Iraqi, 36.0-36.9, Tripoli, Banias....2.31

Far East, Cargoes FOB Lutong, Sarawak
- Seria Light, flat....$2.57

KEY TANKER RATES

(Last paid, per long ton, single voyage)

- **U.S. Gulf-New York, clean....(USMC+20%) $3.42↑**
- U.S. Gulf-New York, dirty....(USMC+5%) $2.99
- **NWI-USNH, dirty....(USMC—40%) $1.65↑**
- **NWI-UK/Cont., dirty....(Scale—32½%) 21/11*↑**
- **Pers. Gulf-UK/Cont., dirty..(Scale—45%) 32/11*↑**
- Persian Gulf-USNH, dirty....(USMC—60%) $5.08

**Sterling.*

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PETROLEUM WEEK REPRESENTATIVES

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Jackson 3-6951

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Mohawk 4-5800

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Mile High Center, 1740 Broadway
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Houston 25 — D. O. Hanson
724 Prudential Bldg.
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1125 W. Sixth St.
Huntley 2-5450

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500 Fifth Ave.
Oxford 5-5959

Philadelphia 3 — W. A. Potter
6 Penn Center Plaza
Locust 8-4330

Pittsburgh 22 — J. E. MacArthur
Room 1111, Oliver Bldg.
Express 1-1314

San Francisco 4 — William C. Woolston
68 Post Street
Douglas 2-4600

Tulsa 3 — J. A. Hartley
909 Enterprise Bldg.
522 South Boston
Gibson 7-5594

England, London E. C. 4 — E. E. Schirmer
McGraw-Hill Co., Ltd.
95 Farrington St.

DEPT/Service & Equipment Companies

WELDON MARTIN has been appointed executive vice-president of Weatherford Oil Tool Co., Houston, and **James C. Niver** succeeds him as vice-president of finance. **Thomas E. Remp, Jr.**, Hannover, West Germany, vice-president, distribution (foreign), and **Addison Love**, vice-president, chief engineer, and works manager (foreign), will head Weatherford's Eastern Hemisphere operations. Two new vice-presidents at-large are **F. H. Drury**, Weatherford Oil Tool Co., Ltd., Edmonton, Alberta, and **R. H. Hume**, president of Fabrimex S.A. de C.V., Mexico City, a subsidiary. **Walter Carter** is vice-president of the Ranch Division.

W. Martin

J. R. Yancey

J. R. (Dick) YANCEY has been named vice-president of Oil Center Tool Co., Houston. He will continue to serve as chief engineer, a position he has held since 1957. Yancey joined Oil Center Tool in 1956 as a research and development engineer. Before that he was vice-president of manufacturing for A-1 Bit Tool Co.

J. R. STITT, H. B. POLLOCK, and **B. P. WEBB** are managers of the new product sales divisions recently set up by Oronite Chemical Co., San Francisco, subsidiary of Standard Oil Co. of California. Stitt is the new sales manager of the petroleum and rubber chemicals division, Pollock the surface coatings and plastics chemicals division, and Webb the industrial chemicals division. The three men have formerly held executive positions with Oronite. To support the new field sales organization, three new staff divisions have been established. Managers of the divisions are **R. E. Echols**, product development and market research; **T. R. Johnson**, advertising and market services; and **W. M. Burge**, sales promotion.

JOHN H. CALDWELL has been named Southwest district sales manager for Nicolet Industries, Inc., with headquarters in Houston. He will be responsible for Nicolet's pipeline felt sales in Texas, New Mexico, Oklahoma, Kansas, Arkansas, Louisiana, and Mississippi.

WILLIAM S. LENNARD is the new area manager of drilling equipment sales, and **Norman G. Kirkland** area manager of refinery and pipeline sales, for U.S. Steel Corp.'s Oil Well Supply Division, in Los Angeles. Both Lennard and Kirkland joined Oil Well in 1948, and were most recently city representatives in Los Angeles.

R. C. Yount

G. Pope

GERALD POPE moves up to vice-president, sales, and **RICHARD C. YOUNT** to secretary and treasurer, of J. B. Beaird Co., Shreveport, La. Pope, who has been in Beaird's sales department for the past 13 years, was most recently general manager of sales. Yount has been comptroller since he joined the company early last year.

JULIUS CARVER is manager of Western Co.'s new service district at Woodward, Okla. The new station will serve the Anadarko Basin of northwestern Oklahoma and south-central Kansas. Carver was formerly sales engineer at Western's Liberal (Kan.) district.

J. Carver

N. Rodgers

NED RODGERS has been promoted to director of engineering for American Iron & Machine Works Co., Oklahoma City, and **Alvie Gooch** succeeds him as chief engineer. Gooch, who has been with American Iron for the past ten years, was formerly assistant chief engineer.

JOE ZINKGRAF has been promoted to manager of machine tool sales for Wessendorff, Nelms & Co., Houston. He succeeds **Charlie Whitehead**, who recently became assistant to the president. Zinkgraf has been with the company since 1952.

RALPH P. WATKINS is president of a new Houston company called International Controls Corp. The company will design and manufacture

JOHN L. PAUSCH moves up from president to the newly created position of chairman, and **Harry Knippenberg** becomes president and general manager, of Dresser-Ideco Co., Columbus, Ohio, and not of Ideco, Inc., Dallas, as previously reported (PW—Dec.30'59,p50).

automatic and remote control equipment for petroleum production, for gas and liquid pipelines, and for various chemical and petrochemical processes. Watkins resigned from Southwestern Industrial Electronics Co. to form the new company. Others associated with the new organization are: **Thomas J. Reynal, Robert L. Deutsch, Lee B. Tully, Jr.,** and **John H. Maness.**

T. C. Williams

F. W. Argue

T. CORTLANDT WILLIAMS has been elected chairman of Stone & Webster Engineering Corp., and **FRED W. ARGUE** succeeds him as president. Williams has been president since 1955, and Argue was named executive vice-president in 1959. **Alfred L. Hartridge,** formerly financial vice-president and treasurer, becomes executive vice-president, and **Dr. Arthur J. Good,** vice-president and comptroller, becomes vice-president and treasurer.

HAROLD BOTTOMLEY, petroleum consulting engineer, has been retained on a long-term contract by the Treco Construction Division of Vitro Engineering Co., in Tulsa. The division was formerly known as The Refinery Engineering Co. Bottomley was vice-president of that company from 1947 to 1953, when he left to become a consultant.

KEITH McCARLEY has joined Tyson Smith Co. as manager of its Corpus Christi district. He will direct sales and service operations in South Texas, and will coordinate the company's branch office activities in McAllen. McCarley was formerly associated with the Union Tank Division of Butler Mfg. Co.

L. J. (Joe) CONNER has been appointed manufacturer's representative for Herb J. Hawthorne, Inc., Houston. Conner, who has been with Hawthorne since 1949, will maintain contact with the company's customers in the field, and with the network of authorized dealers in the western United States.

EARL F. SNOW has been named materials manager of the Baash-Ross Division of Joy Mfg. Co., with offices in Houston. He is responsible for all production and material control, traffic, and purchasing. Before joining Baash-Ross, Snow was associated with Reed Roller Bit Co.

ROBERT D. CRANE is the new director of purchases and traffic for Dresser Industries, Inc., Dallas, succeeding **Robert C. Kelley,** who is retiring. Crane was formerly assistant director of purchases.

R. D. Crane

D. R. Thomas

DILLARD R. THOMAS is administrative assistant to the sales manager of Reed Roller Bit Co., Houston. He was first associated with Reed from 1951 to 1958. He then joined Kendavis Industries, Inc., where he has been a drilling engineer.

JOSEPH E. KLUEGER has been named sales manager, and **George H. Nolte** chief engineer, for the new Southwest region of Pannellit, Inc., in Houston. Klueger, who has been with the company since 1952, was assistant chief engineer, and during the past year has been active in sales supervision in the Southwest. Nolte was most recently manager of panel manufacturing. The new office will handle sales and service of Panellit's line of process control equipment.

GORDON TREAT heads Lone Star Steel Co.'s new field engineering department, in Dallas. Treat joined Lone Star a year ago after a five-year association with another steel company, where he also was involved in field engineering. In the past, Lone Star's field engineering was handled by several district sales offices.

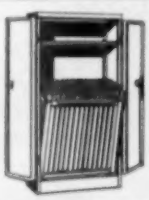
D. C. BRELAND has joined the Petreco division of Petrolite Corp., in Houston. He will be concerned with chemical and electrical dehydration and other Petreco electric treating processes and equipment. He was most recently associated with Hoil Engineering Co., and before that, was with Mene Grande Oil Co.

R. G. Ayers

R. E. Batchelor

W. J. Bovaird

ROSCOE G. AYERS, RAYMOND E. BATCHELOR, and **WILLIAM J. BOVAIRD** were elected to new positions at Bovaird Supply Co.'s annual meeting in Tulsa. Ayers is the new senior vice-president, and Batchelor succeeds him as vice-president and general manager. Batchelor was formerly vice-president and general manager of sales. Bovaird moves up from sales manager to vice-president of sales.

MAP  FILE

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The Tulsa Trial—Another Black Eye

TWO WEEKS HENCE, if the present schedule holds, enough attorneys to make up a small-size army will finally get to the combat stage of a king-size legal battle in a Tulsa courtroom.

It has taken them 18 months to get this far. And it's anybody's guess whether it'll be a matter of months or years before the final decision is written into the records.

Pretrial conferences, stipulations, and other agreements have shortened the probable length of the trial substantially. But it will take at least four to six months for the government and the defense to present their testimony and rebuttals. After that, there'll be a wait until the verdict comes in. Then, depending on which side wins, additional time could be involved in appeals and higher-court deliberations.

THE WHOLE AFFAIR is an ironic outgrowth of the Suez Crisis of three years ago, something that should never have happened in the first place. Nevertheless, the U. S. oil industry did a stupendous job of helping the Free World—particularly Western Europe—weather the abrupt interruption of essential oil supplies from the Middle East.

The industry's "rewards" included congressional investigations of the Middle East Emergency Committee, sarcastic criticism, and ultimately an offshoot indictment by a federal grand jury alleging that 29 oil companies had conspired, during the crisis, to raise the price of crude and gasoline.

WIN, LOSE, OR DRAW, there's little doubt that oil as an industry, is going to wind up with another shiner in the minds of the workaday public. Most people avidly read the details of charges and allegations, but few pay attention to denials or time-consuming rebuttals.

There's no escape from the fact that the government's side of the opening testimony will make "interesting" reading in the newspapers, as it has from the date of the indictment in 1958. In due course, the trial will settle down to the "ho hum" stage in the papers. But the initial charges, and the public relations black eye they'll cause, will be remembered for a long time to come.

Unfortunately, there's little that the oil industry can do about it collectively. But it should point up to individuals that oil needs every champion it can get, on any and all occasions, to compensate for affairs like this.

THESE SAMPLES ARE ON THEIR WAY to the Dowell Laboratory. They're from a problem well that could be yours. The Dowell engineer will request a quick and complete analysis. The Customer Service Section of the laboratory will go right to work to furnish a written report of the facts. Combining the lab findings with his knowledge of local conditions and your specific well problem, your Dowell engineer can recommend the best treatment. Not every well problem requires a Lab report, of course. But when you *need it*, Dowell *has it*. These research facilities, this desire to dig deep, are more reasons why Dowell gives you the most value per treatment dollar, Dowell, Tulsa 1, Oklahoma.

Services for the oil industry

DOWELL

DIVISION OF THE DOW CHEMICAL COMPANY

First diesel engine is driven ashore at El Palito by a truck that accompanied the shipment from Newport News.

KELLOGG PROCUREMENT

CUTS REFINERY COSTS

WITH LANDING CRAFT

When faced with the problem of getting four huge diesel engines from the United States to Venezuela, and installing them for generating power in a remote coastal refinery, Kellogg minimized man-hours for shipment and installation by chartering a landing craft.

Customary dismantling, crating, and reassembling were avoided; engines were landed almost at the power plant site; the entire job completed within just ten days after the craft had left Newport News, Virginia.

This unique procurement operation, part of Kellogg's complete turn-key responsibility for Mobil Oil Company de Venezuela's new 50,000 BPD refinery at El Palito, is typical of the cost-cutting ingenuity that goes into every phase of Kellogg's coordinated procurement-engineering-construction services for oil companies throughout the world.

Refinery engineers interested in the details of Kellogg's complete assignment at El Palito are invited to send for the current Kelloggram—"Operation Procurement", and a recent folder on the entire project—written in Spanish and English.

Weighing 100 tons each, the first of four diesel engines is hoisted aboard landing craft at Newport News, Virginia.

THE M. W. KELLOGG COMPANY

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